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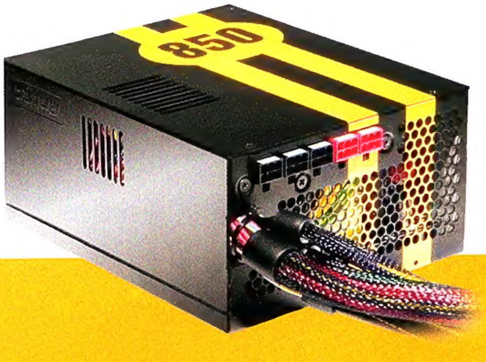

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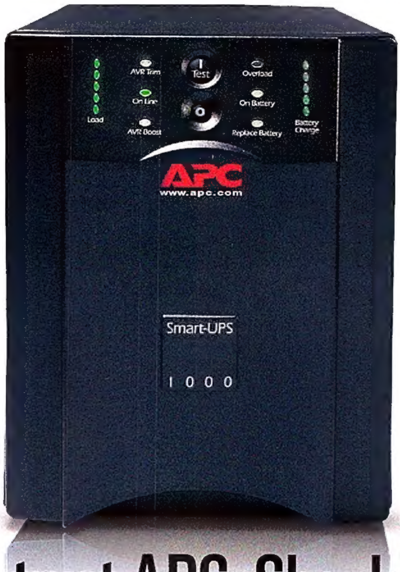

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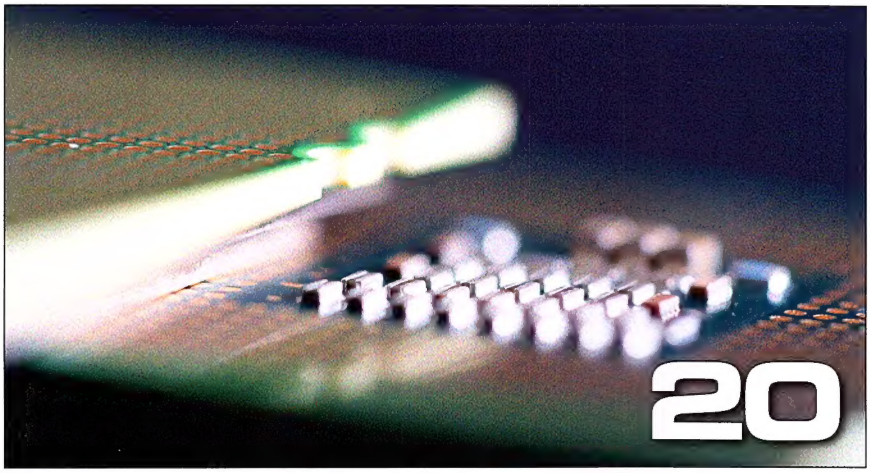

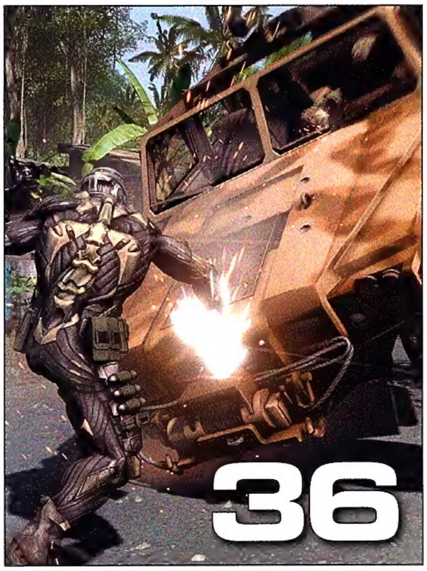

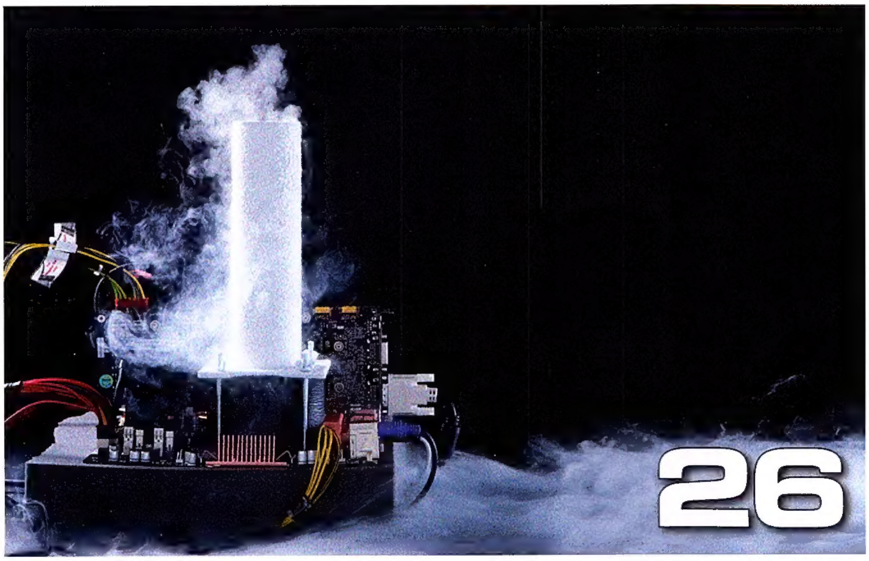

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Very Atomic

Atomic is many things to many people. It is a beautiful magazine that shares and reflects your love of tech and games. It is also a big online family of friends, who, over the years, have grown together and shared everything that true friends do.

To Josh, our fireball tech writer, *Atomic* is a door he'll lead you through into a world of the super-hardcore. Feast this month on his CPU epics, diving into a world of extreme overclocking, liquid nitrogen mist spilling out from every page, and across a slabload of the very hottest CPUs, all pushed to the limit.

Atomic is also now, for Josh, an outlet for his completely unique views on the hardware industry, and its inventions. His new regular opinion page *The Chippery* is without doubt the most magnificently geeky thing I think I've ever read in my life.

Across the years since 2001, when we launched, *Atomic* has also meant *change*. Nothing stands still, least of all the rush of tech evolution, and our reporting of it. After many years we're reinventing the monthly *Hot Box* section. Now, we have elevated *Hot Box* to be an annual event, a grand showcase of the best of Australian and Kiwi talent.

As we've grown, we've seen you grow. A new generation of Atomicans thrive within our community, and we realise that many look ahead to a life and a career in tech. To serve you better, starting this month, we're launching a new regular section examining tech and games courses. *Atomic.edu* is for you all – school leavers, graduates, TAFE students, and really, anyone who wants to learn something new. Each month we'll dig into new areas to help broaden your understanding of the opportunities out there, whether it's for love or money.

Atomic will mean a happy memory to our *Geekette*, Kate Inabinet, who will soon be entering a beautiful new chapter in life, that of being a mother. Sadly this means she'll be stepping back from her monthly gifts to *Atomic*. I know you all will join me in thanking her for entertaining us over the years.

Next month *Atomic* becomes home to the new Editor, taking over from Logan and leading us into a new era. I know you'll like what he brings. He was with us the day *Atomic* launched, and some of you with long memories may know him as 'Hawkeye'. Watch this spot next month for his grand entrance.

For me, *Atomic* means more than can ever be said. It has been all of my life for the last seven years, and the source of many laughs, excitement, proud accomplishments and wonderful new friends. From the original mission to make a kickarse magazine that was sexy, beautiful, funny and completely fresh, it has become far more than the sum of its mighty parts. *Atomic* is the greatest thing, and its future is as strong as it is exciting.

It is with immeasurable pride and satisfaction, then, that I've decided it's time for me to walk away and try something different for myself.

I have been honoured to work alongside remarkable people. I've shared, and will continue to, very good times with so many of you personally.

The whole world of *Atomic* has brought all kinds of happiness to so many of you, and will continue to for a very long time. Knowing this is my greatest joy.

Ben Mansill
bmansill@atomicmpc.com.au

Issue 80 winners: 5 copies of *Ninja Gaiden Sigma*: T Pietraszek, Maryland NSW, S Abela, St Albans VIC, M Lymn, Mt Barker SA, K Sharp, Aldgate SA, V Vastrad, Bella Vista NSW.

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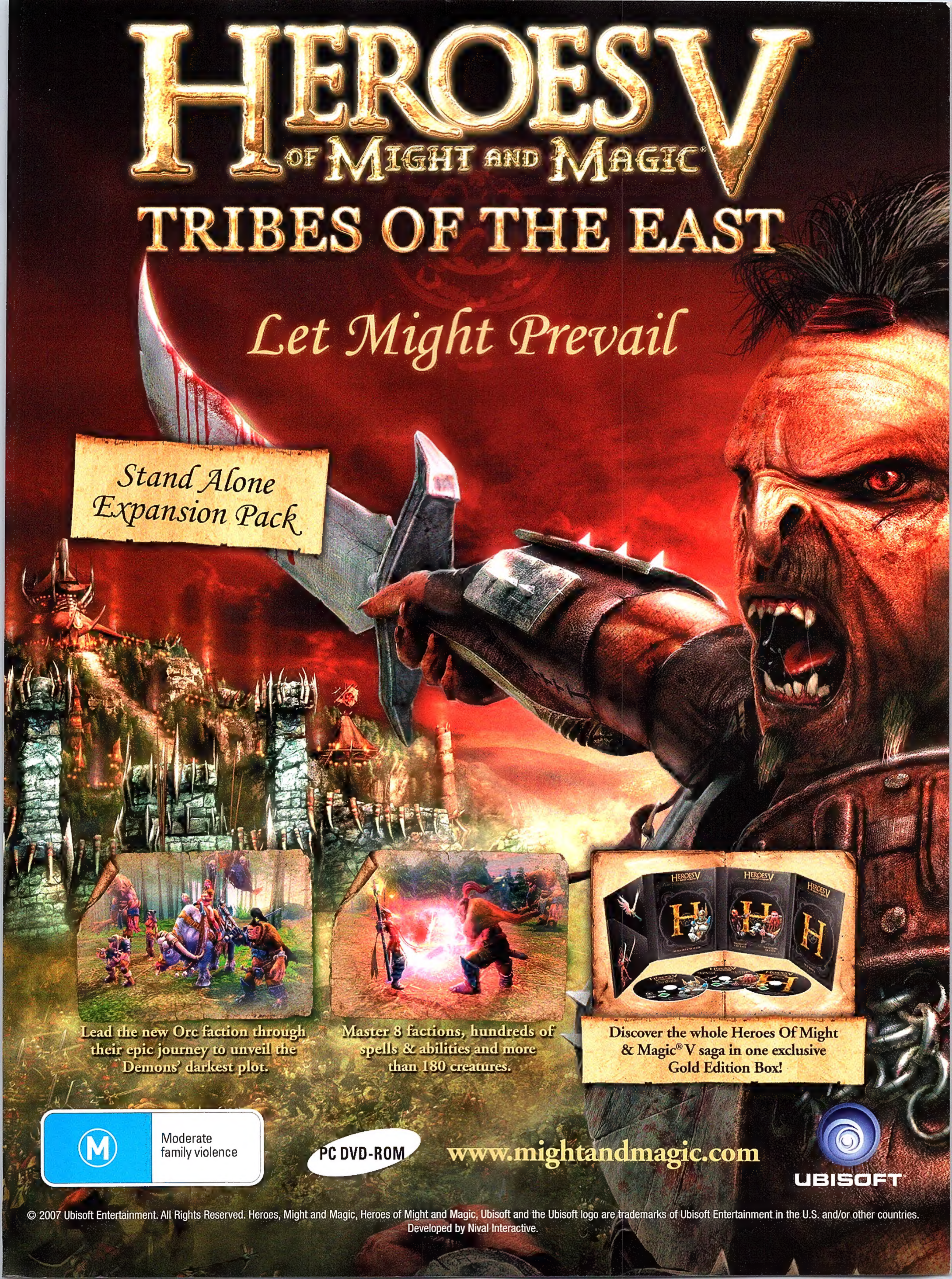

Overclock King 'Fugger' looks on as Intel's focus shifts around him.

Intel Developer Forum (IDF) 2007

Peering into this year's IDF to see through the propaganda to find the facts and figures.

This year's IDF has certainly been an interesting one. Riding on the coat tails of last year's Core micro-architecture-heavy IDF, this year's event was focusing on the furthered progression of the Core micro-architecture in the form of the 45nm parts, code named Penryn (mobile), Wolfdale (dual core) and Yorkfield (quad core).

With the first generation Core processors, code named Conroe, Allendale, Conroe-L and Kentsfield, being great overclocking successes and gaining much respect within the enthusiast scene, Intel's reaction was intriguing to say the least.

Intel, for many years looked down upon the concept of overclocking. Overclocking in general was an idea that would not only get Intel's knickers in a knot, but often cause friction within the media or development sector. Now it seems Intel's policy on overclocking has taken a radical redirection.

Paul Otellini, the figurehead of the Intel Corporation, paired up with none other then renowned, revered and respected international overclocker Charles 'Fugger' Wirth. Equipped with his triple stage cascade cooler, Fugger went about contently overclocking the 45nm Yorkfield quad core during Paul Otellini's keynote presentation.

During the presentation, Fugger overclocked the yet to be released Intel Core 2 Extreme QX9650 (stock 3.33GHz Yorkfield based) to clocks varying between 5.1GHz and 5.4GHz, dependent on the benchmark.

Utilising the power of the new processor and his knowledge of tweaking, Fugger appeared calm and collected as he joked with Paul and went about obtaining three world records on the fly, in front of the audience.

Seemingly with little effort, Fugger obtained the world records for Super Pi 1M, Aquamark 3 and CineBench R10 32bit within just over 2 minutes on stage and a total of 10 outright world records throughout the two days of the forum. These records were all reached using the Yorkfield based system and sub-zero cooling.

Also making an appearance at IDF was the anticipated V8 platform named Skulltrail. This demonstration featured two Yorkfield quad core processors as well as SLI 8800 series graphics cards from NVIDIA.

No need to check that last sentence, finally NVIDIA has given a license to Intel for SLI on an Intel chipset. Unfortunately, there is a catch, this being that SLI is only licensed to the Skulltrail V8 platform. Although Intel's desktop chipsets are capable of running SLI (e.g. P35 and X38), NVIDIA are not giving Intel the license to utilise SLI on these platforms.

Adding to Intel's embracing of the overclocking phenomenon, the Skulltrail system featured at IDF had each of the quad core processors in the dual socket platform overclocked to 4GHz. The cooling system used was a two-loop water cooling configuration. One loop cooled the dual socket processors whilst the second loop cooled the SLI 8800 series graphics cards.

Also during the Intel Developer Forum, Intel celebrated ten years of the grand education and propaganda event with a presentation by some of Intel's past and present leaders; Gordon Moore, Andy Grove and Paul Otellini.

Times are changing, and with Intel openly embracing overclocking we can only hope that this acceptance allows for doors to open for the world's overclocking masters.

Josh Collins

SHORT CIRCUITS

AMD recently released its Opteron 2300 series quad core processors based on the Barcelona core. The series features processors starting at 1.7 GHz and ranging upwards to 2.0GHz. These processors are what AMD has been coining as 'native quad cores' with four cores on a single die, opposed to Intel's current design of two dies with two cores each, equaling to a total of four operational processing cores.

Intel has been creating a ruckus recently with the soon to be released 45nm processors, the success of its 'tick-tock' development model and success of the Core micro-architecture. Within this fuss has arisen the demonstration of Intel's Nehalem processors on a 32nm manufacturing process. This could spell further trouble for AMD as they only begin to start the transfer from 90nm to 65nm – tick, tock, tick, tock.

Recently the motoring and gaming industry said goodbye to a legend. This legend was Colin McRae. Famous for his domination of the world rally scene and prominent involvement in the development of the Colin McRae Rally series, his passing was tragic and took everyone by surprise. From the lads here at atomic, farewell mate and rest in peace.

NVIDIA recently amused many with the release of their men's and woman's range of 'gaming shorts'. That's right, if you want to get your grind on with a hot geekette, you'll know prior if she's legit just by checking out their fashion sense. For the lads, this addition to your wardrobe will add to your potential of

See you at Live!

The great games and tech show made of pure Atomic.

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Be spellbound by our celebrity MC Dr Karl Kruszelnicki (after 2:30pm), and be dazzled by science and technology in ways you've never seen before.

We've got tech demos and presentations, we've got extreme overclocking with Guru Josh and his wicked ways with liquid nitrogen.

Our stage MC Losty will keep the show at energy levels unheard of beyond the surface of the sun. Atomic Live, we know, will be a memorable even for all. Stay an hour, or stay all day. We've got giant inflatable activities too, so see, we've thought of everything!

What: The greatest tech, games and all-round entertaining event of the year

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How much: Completely free!

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being the next 40 year old virgin – go son!

Intel has announced the purchase of the physics engine Havok. With the industry muscle of Intel behind it, Havok will no doubt continue its dominance of the physics scene. Additionally, with this move the concept of dedicated processor based physics acceleration, especially in games, on multi-core processors continues to gain strength as a possible future reality. It all spells more trouble for Ageia's push for a foothold in the physics market.

Microsoft recently celebrated its silver anniversary. With this celebration, it took the chance to release a range of anniversary peripherals, from mice to web cams to keyboards. Of particular interest was the resurrection of the SideWinder branding. This time around though, the new SideWinder release will not be a joy stick, as it has been well known for in the past. This time around rather, it's opting for the release of a new gaming mouse imaginatively named the SideWinder Mouse – they're creative buggers at Microsoft.

FUTUREPROOF

Gazing into the crystal ball of tech

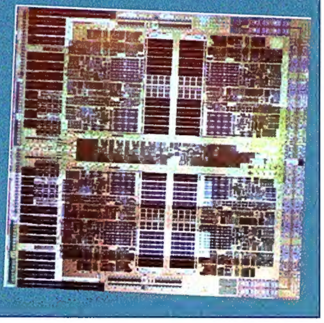
When 4 becomes 3

AMD appears to have actually kept a secret for once. Recently revealing to the world its plan to not only release quad core desktop processors based on the Barcelona core under the branding of 'Phenom' but surprising for many, also release a triple core offering.

With many industry individuals immediately jumping to the conclusion that AMD would simply be turning off failed cores on their quad core processors, AMD said it was simply meeting a need yet to be given a market place.

The company's reasoning was that quads have less headroom than dual core processors (SKU scaling, overclocking etc), yet quad core processors obviously have greater multi-threaded and multi-tasking capability.

Considering the chance to open up a new market and offer a little from both the dual core and quad core fields, AMD have also opened itselves up to the potential to receive criticism over it's motives for this new market. Many individuals both in the industry and consumers alike are questioning whether these processors will be the left overs of the quads that just didn't quite cut the mustard.



POST OF THE MONTH

We like a good story, we do. *Atomic* has more than its fair share of talented storytellers, and we regularly enjoy tales of funny, adventure and insanity.

We specially love them if it's a true story, double especially if it's beautifully told, and triple especially if it involves an escalating comedy of chaos.

That's exactly what **POTM 83 winner Mac Dude** delivered. If you haven't read it, give yourself a few minutes, relax, and enjoy a tale so impossible it must be true.

It's a beautiful thing, and the funniest stuff we've read on the magical *Atomic* forums for ages, which is really saying something, it's Funny Central at Atomic most days, so this is pretty special.

Onya Macca, we'll send you a Logitech G5 Throwing Mouse, for next time you need to fight off the local wildlife.

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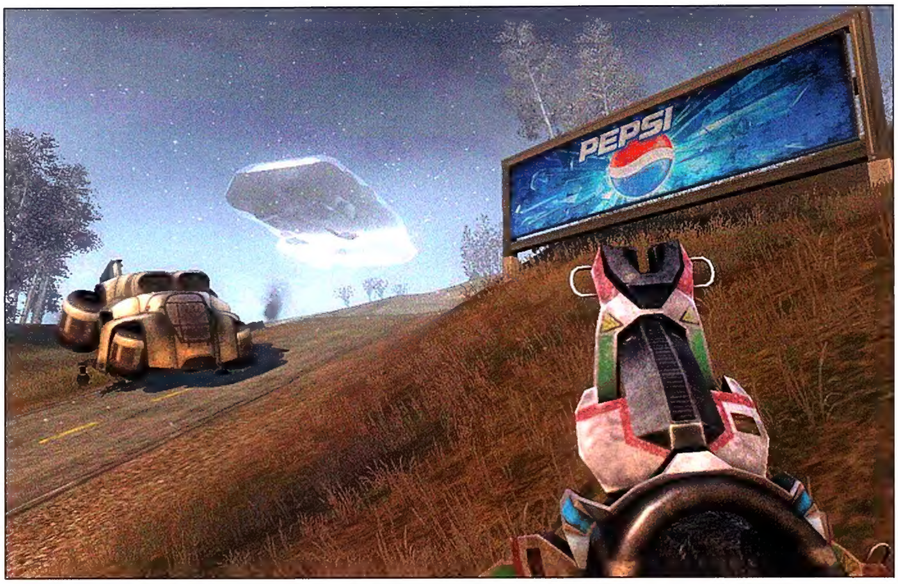
Every **Post of the Month** *wins a fabulous* **Logitech** *mouse from the brilliant people from* **Logitech**... *Huzzah!!!!*



In-game ads must die

Publishers try to annoy us less, while still spinning a buck.

US$600 million is a reasonable wad of cash. Enough to buy the home of Bill Gates three times over or enough diamonds to form your own cartel, US$600 million also represents the estimated worth of in-game advertising come 2010, according to Parks Associates consumer research. Globally, in-game advertising could be worth US$2 billion in the same timeframe.

Reaching the free spending 18 – 34yr old demographic via video game adverts is big business and it's not going away anytime soon. We've grown accustomed to *'the way it's meant to be played'* Nvidia ads exploding on our screen before we tackle the latest FPS, or genre-appropriate billboard ads in racings sims, but in-game advertising is evolving into a far more pervasive force.

IGA Worldwide – considered the biggest player in dynamic in-game advertising – recently secured a 3 year partnership with Codemasters, meaning static and dynamic adverts will find a home in the software developer's future releases. 'We have extended our partnership with IGA as they won't compromise the brand experience or content credibility of our product offerings for consumers' explains Codemasters CEO Rod Cousens. With deals like the aforementioned becoming more frequent, the subject of compromise has some gamers worried.

The potential for advertising to intrude on an experience which relies heavily on immersion makes the growing blitz of game ads a tenuous tightrope to walk. *Dungeon Siege II* was a case in point of in-game advertising gone awry, featuring an NPC who ripped the still-beating heart out of the fantasy ambiance as he confided in the player – not about swords and sorcery - but treasures which could be provided via an unlock code found in the PSP version of the game.

Fortunately companies are discovering more palatable ways to deliver advertising to gamers. Ubisoft recently made available some of its most popular titles (including *Prince of Persia: Sands of Time* and *FarCry*) as free 'ad supported' downloads via Fileplanet. Ubisoft's venture is a clever take on injecting advertising into games, offering the instant reward of a top shelf title in return for chiefly unobtrusive banner ads populating the loading and options screens but not within the game itself. There's no doubt some will shirk at the sight of Subway logos in-between *FarCry* maps, but with Ubisoft and others exercising an 'abandonware with a catch' mentality, golden opportunities exist for polished games to become accessible to a whole generation of players without the monetary muscle to shell out retail price.

Expect to see in-game ads not just in aging titles re-released, but bundled with some of the blockbuster games of the year. Neil Postlethwaite - producer on *Enemy Territory: Quake Wars* – recently revealed the latest iteration of the *Quake* legacy will feature targeted advertising.

'To help cover on-going support without passing the costs on to the gamer *ET:QW* will feature appropriate advertisements in select locations of our levels' says Neil. 'The ads aren't intrusive and you won't have to interact with them; they'll just be part of the normal environment.'

We can only hope that whatever fusion of marketing and gameplay lies on the horizon, is offset by tangible benefits to the end user, rather than serving purely as an apparatus for extra revenue. **James Matson**

> “Reaching the free spending 18-34yr old is big business & isn't going away”

SHORT CIRCUITS

An Eve ship targets the Planet of the Orcs

EVE Online looks to expand its impressive player base even further, with news that CCP Games is hooking up with TransGaming Technologies to port the space MMO to the Mac and Linux platform. EVE Online clients on the new platforms will still integrate with the existing single server architecture that PC clients currently connect to, enabling cross-platform battles for space supremacy. We suspect Eve is just the sort of game that will find a welcoming heart with Mac and Linux gamers.

Capcom - not content to let the carcass of the first Street Fighter movie rest - are joining forces with director Andrzej Bartkowiak to bring another adaptation of the 2D beat-em-up to the silver screen. Rumored to focus on Chun-Li and her fight for justice, filming is expected to start sometime in 2008.

Poor reviews of Lair for the PS3 (due mostly to a frustrating control system) have prompted Sony to issue a 'reviewer's guide' which they hope will

Safer hunting

ESRB takes to Manhunt 2 with the ratings stick

Manhunt has cemented itself into gaming history as synonymous with violence and gore. Rockstar Interactive couldn't have designed a game containing death by plastic bag suffocation without gaining that kind of notoriety. It would seem however that after initially being tagged with an 'AO' rating by the ESRB (Entertainment Software Rating Board) for Manhunt 2, the game has been toned down slightly and now carries an 'M' rating. Most of the changes revolve around censoring the harsher death moves in the sequel with grainy or dark 'filters', leaving the player to conjure up their own twisted ideas on how the gore plays out. The only scene completely removed is the eye wateringly descriptive 'testicle ripping' sequence. Unfortunately (or not – depending on how you look at it) the toned down adaptation of Manhunt 2 will exist alongside an illegal warez release of the original uncut version, which somehow wound its way onto torrent sites. While less graphic content – and a lower rating – means thumbs are up for an Australian release of the retail Manhunt 2, it begs the question of just how the uncensored version leaked, and whether Rockstar really mind that much.

Sharing XNA

Games by the people, for the people

While Microsoft remains the technology world's favourite whipping boy, there's no denying the lure of its proposed 'Youtube for games' service, which would provide an online repository and platform for the download and discussion of games created using Microsofts XNA framework. For those not in the know, XNA is a set of programming libraries developed by Microsoft specifically for game development and based on the .NET 2.0 framework. XNA Game Studio Express IDE is freely available from Microsoft's website for anyone who wants to get their hands dirty creating homebrew games for the PC or Xbox platforms, without worrying about the specifics of writing code for each platform. In a recent magazine interview XNA Group general manager Chris Satchell explained his commitment to providing people with 'a stage to play on and a distribution medium so that they can show off their creativity to everyone'.

give critics a better understanding of how the game should be played. If a professional game reviewer can't figure out how to play a game without hand-holding from the publisher, what hope does the average game have?

Korean MMO developer Reloaded Studios has announced their intent to purchase CryENGINE 2 (the engine behind Crysis) for use in an up-coming MMORPG. The sheer concept of a massive multiplayer game powered by the DirectX 10 wizardry of CryENGINE is cause for frenzy, of the good kind.

The world of professional gaming has taken a couple of low blows lately, with the WSVG (World Series of Video Games) cancelled permanently, and the Electronic Sports World Cup halving the prize pool on offer in comparison with the 2006 event. The board of Games Media Properties – organiser of the WSVG - cited a lack of profit as the driver for the cancellation

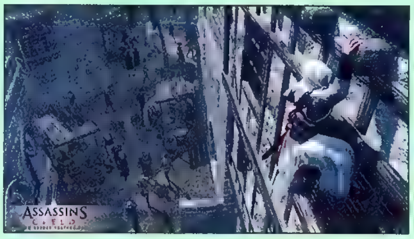
PIPELINE Hot games to watch out for

Spore

Release date March 2008

Spore looks to be a shiny jewel amongst the constant flood of sequels, prequels and rehashes. A game that plays on the evolutionary stages of life, Spore sees the player create and nurture entities from the microscopic level through to a race for the stars, through endless creature permutations. Each of the phases in Spore is designed to be a unique gaming experience in its own right, designer Will Wright likening the gameplay of the various stages to everything from *Diablo* to *Sim City*. Bursting with promise and now with a tentative release date, Spore is set to breathe new life into the Sim genre.

[Platform] PC, PSP, DS, Mobile
[Developer] Maxis
[Publisher] Electronic Arts
[Web] www.spore.com



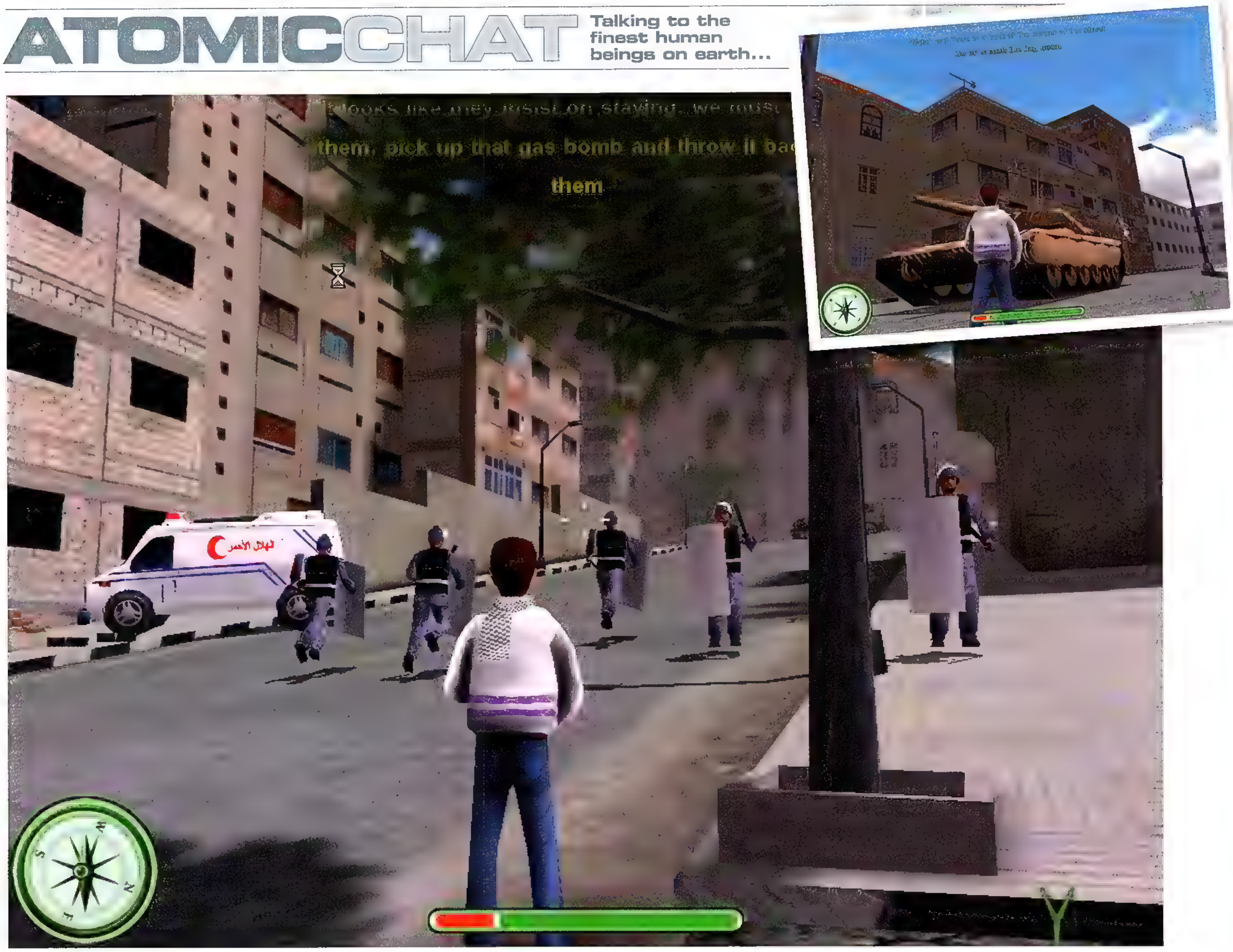
Assassin's Creed

[Release date] Late 2007

Assassin's Creed has been busy picking up awards accolades and conjecture around the web ages before its supposed release date. Taking on the role of a legendary Assassin during the crusades (circa 1191 AD) Assassin's Creed will feature completely interactive environments for leaping, sneaking and dealing death to your targets and – more interestingly - reactive NPCs as well. Your actions in a market square can turn a neutral crowd against you as you pick off your intended targets, leaving you in need of a good exit strategy. With cities based on historical drawings from the 3rd Crusade and rumors of sci-fi / genetics elements weaved into the storyline, Assassin's Creed is shaping up to mercilessly slay hours of spare time.

[Platform] PC, PS3, Xbox 360
[Developer] Ubisoft Montreal
[Publisher] Ubisoft
[Web] www.assassinscreed.com

ATOMICCHAT Talking to the finest human beings on earth...


looks like they insist on staying...we must
them, pick up that gas bomb and throw it ba
them

Radwan Kasmiya

CHRISTOPHER TAYLOR discusses war, politics, piracy and gaming with Radwan Kasmiya, chief executive of the Syrian developer Afkar Media.

In 2001, Syrian studio Afkar Media (**www.afkarmedia.com)** attracted the attention of the western press by releasing Under Ash, a shooter in which the player stepped into the shoes of Ahmed, a Palestinian fighting against the Israeli occupation. 2003 saw the release of the sequel, *Under Siege*. Both games have been cited as examples of anti-Israeli propaganda, but Afkar Media's chief executive Radwan Kasmiya - designer of both titles - claims they were created to promote peace. Whatever your opinion on Kasmiya's message, what he's trying to do with the medium is undeniably interesting.

On a side note, both *Under Ash* and its sequel have sold very well in the Middle East - a huge achievement for Kasmiya and his team considering the Middle East is a region with serious piracy issues. The games were, as you may be able to tell from the screenshots, developed on a tight budget.

Note: Any edits we've made to Kasmiya's answers were done due to his occasionally less-than-perfect use of English. All changes have been indicated, except those we consider to be minor (i.e. incorrect use of punctuation). Every effort has been made to retain the intent and tone of his message.

atomic Can you tell us about your career in games development?
Radwan Kasmiya Well, I started as a business applications developer in my [third year of college] and ended up heading an ambitious media company. I was so lucky to make the first Arabic videogame, *Under Ash*, in 2001, followed by *Victory Castle* in 2002, *Under Siege* in 2003 and *Quarish* in 2005. I am [currently] working on a couple of projects. [They will] be revealed soon.

atomic Why have your games done so well in a region where piracy is rampant?
Radwan Kasmiya: My theory is that local pirates felt responsibility and did not crack our games because they thought such projects need a

chance to survive. Most crackers are programmers and I think they know how hard it is to make a videogame in a third-world country, so they just let us pass through. It was a swim in a pool of sharks, yet we survived ... this time, at least.

atomic Why did you choose Israel and Palestinian territories as a setting for games? What do you want gamers to take away from *Under Ash* and *Under Siege*?
Radwan Kasmiya I consider videogames a contemporary art form. Art should reflect its society, culture and history. Furthermore, it should teach people to improve themselves to be better beings. The Palestinian conflict is in the heart and soul of the majority here - we have been raised studying it, reading it, watching it. You simply can't avoid that and do a game about something else. My quest was to explore what I can do as a game designer. It is true that it took me some time to figure out what I want to say about it. In *Under Siege*, four of the five main characters die. And if you shoot any civilian (Arab or Israeli) you will lose, which is uncommon in videogame culture. I wasn't designing [the] games [to be] fun, I was [aiming to send] a message about how violence, arrogance and ignorance are cooperating to kill our humanity.

atomic The subject matter of these games is pretty provocative. Are you are all concerned that someone could misinterpret the games and view them as encouragement to participate in activities such as suicide bombing and stone-throwing?
Radwan Kasmiya Come on, nobody will act criminally after playing videogames or watching violent movies. As for [the possibility of the message of the games being misinterpreted], I agree with that. The internet is full of articles about my games that are bursting with wrong facts--some saying we are recruiting terrorists, others that we glorify suicide bombing. Misinterpreting will occur regardless of how hard I try [to prevent it].

atomic The trailers show unarmed Palestinians - one of whom is draped in a flag - being gunned down by Israeli soldiers. This could be seen as promoting resentment towards Israel. And yet, when you shoot a civilian in the game, be they Israeli or Palestinian, you're punished. Is this ambiguity intentional?
Radwan Kasmiya You can't play the Israeli side in *Under Siege*. The player plays Palestinian characters and if he shoots at any civilians he'll be punished. I don't count IDF soldiers as civilians. In fact, the UN consider them 'occupation forces on occupied land' and [says that any attacks on them by civilians or military personnel are legal].

The character in the trailer you've seen is a 13-year-old boy. His real name was Rami Mutawe. He draped [himself] in Israeli flag from a Merkava tank and [was] punished by [having his head smashed in by an IDF soldier]. [The soldier] has never been [punished even though] the incident [was shown] on television. How [would] that encourage teenagers to [resist]?

> **"My message in the games is clear - violence will never pay. And it doesn't matter how well you can play."**

I am sure that [Israelis] have many stories about suicide bombing. I [blame] both [sides in this conflict], but [especially] the Israelis - they are the trained, regular occupation force and they should be the [most] responsible. The picture in the occupied [territories] is very ugly. Since 29/9/00 more than 830 Palestinian and 119 Israeli children [have been] killed according to **btselem.org**. My message [in the games] is clear - violence will never pay. And it [doesn't] matter how [well] you can play - [the message remains the same].

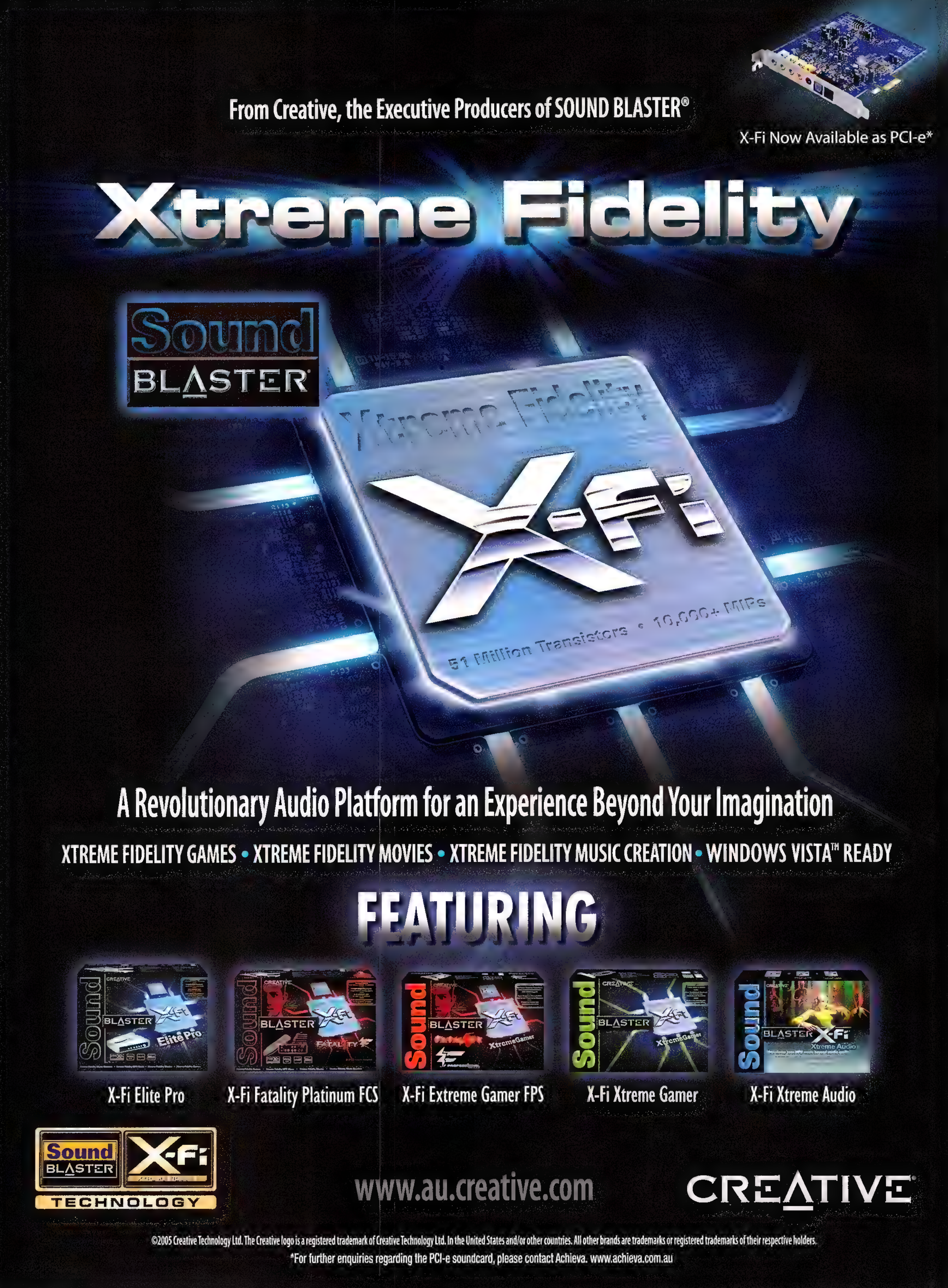
atomic What's your opinion of America's Army and Special Force?
Radwan Kasmiya Both of them were funded by political parties - the Pentagon [in the case of America's Army] and Hezbollah in the case of Special Force. If you ask me, both are pure propaganda. Just [look at this quote] on America's Army. 'America's Army, the official US Army game, provides young Americans with a virtual web-based environment in which they can explore an Army career.' I think it is a recruitment tool funded by American taxpayers. No further comment!

atomic What are your plans for the future?
Radwan Kasmiya More videogames about civilisations, religion, history and culture. All of them [will] raise questions in the player's head and create interest in him to dig for more.

atomic Would you like to reach a western audience?
Radwan Kasmiya Sure, it's just a matter of time ... and a visionary publisher.

atomic Wouldn't a lot of western gamers feel uncomfortable playing a side they may view as 'evil' in a battle against Israel?
Radwan Kasmiya Sure, many would, but I'll take my chances. The feedback I'm getting from the States is quite impressive, especially [as] they figure out what the games are about and that they're not a tit-for-tat thing.

atomic Are you disappointed that Call of Duty 4 - a game that's set in modern times - will feature American and British campaigns, but not Arab and Russian ones?
Radwan Kasmiya Not [really]. [It's] just another example of how [businesses] are manipulating youngsters for a few dollars more. [It's] their call. And I respect it as a creator, but not as a father.



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Online distribution

Alexander Gambotto-Burke takes a look at the success of online distribution a few years on.

Innovation costs too much. That's what you'll learn if you start working at a triple-A game developer at some point in the not-too-distant future. With the average development budget now hitching a ride with Voyager 2, games need to be easily marketable, instant sellers. Why? Retail outlets can only fit so many large game containers onto their shelves, and as such, the games that take up that space need to sell. Your average title will get around two weeks to prove itself before it's marginalised or completely removed, so if the casual buyer can't immediately relate to your product, chances are most won't buy it.

So, the only real way to recoup the massive costs involved in producing mainstream games is to ensure they don't frighten away potential buyers. In other words, they play it safe.

Online, however, things change. Space is no longer an issue, and the most obscure titles can share equal 'virtual-shelf space' with the latest Madden rerun. This not only makes room for quirky AAA games, but also vindicates the indie games industry. Greg Costikyan, known in the industry as 'Designer X', created the Manifesto Games website with the goal of making sure the weirds and wonderfuls of the indie scene get their say.

'The basic idea behind the company,' he explains, 'is to try to build for the industry what independent music and independent film provide for their industries, and to provide a path to market for more creative works that may not reach as large an audience, but can still attract a following. But that's just one side. The other is that we look at the casual game market, which has grown from nothing to a pretty substantial market in a very short period of time by appealing to a largely middle-aged female demographic. Shouldn't it be possible to do the same thing, but do it for people who have traditionally purchased games? We're trying to build a company, but also have a vision.'

As passionate as Costikyan is about that vision, he still doesn't think digital distribution's advantages should preclude traditional publishing deals. 'I think that any small developer should be trying to get distribution through any channels they can.' he says. 'I would never say, "Don't sign a deal with a conventional publisher." What I would recommend is to the degree that you can try to retain digital distribution rights yourself, do so. Don't sign those away. If you get locked into an exclusive deal, and they do a bad job of marketing, or they have a limited distribution range, you're in trouble.'

Jason Holtman is the director of business development at Valve Software, the creators of the Steam client application. The Steam system allows players to compete against each other online on Valve's secure servers; it also serves as a virtual games store, selling

> "Any small developer should be trying to get distribution through any channel they can"

With 13 million users, Steam offers unrivalled exposure for new games.

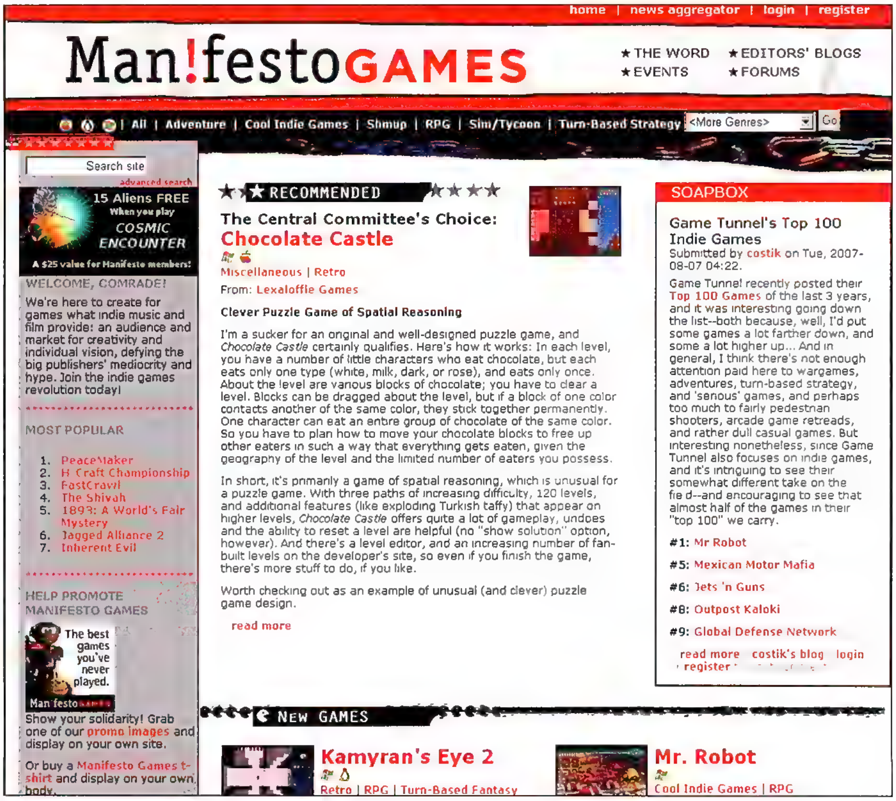
> A developer can use Steam to beta test a game before making it available for purchase by gamers...

independent and triple-A titles. Holtman agrees with Costikyan's sentiment. 'In many cases,' he argues, 'digital distribution complements traditional retail channels. The online channel can be a great way for smaller developers to get noticed by publishers who can secure shelf space in major retail outlets. A great example is Tripwire Interactive's *Red Orchestra*. The game was first released on Steam in November 2005, generated a great deal of interest, and was then boxed for retail by Bold Games and distributed worldwide. By providing more convenient access to games, Steam and other digital distribution services can only benefit the industry. People are finally gaining access to the games they want in the way they expect to access entertainment content. PC titles are experiencing longer sales cycles; both digitally-distributed and boxed retail games, thanks to the greater and longer visibility that digital distribution provides.'

In referring to Valve's system's specific benefits, he points to Steam's 13-million-plus installed userbase; this effectively guarantees that 13 million players will be introduced to one of Steam's offerings, if only because they're using the client to play Valve's multimillion-seller, *Half-Life 2*. 'Steam is a tool that lets developers identify and directly connect with their audience,' Holtman says, 'whether mainstream or niche, from among the over-13 million Steam users. We have both the long tail and a huge breadth of potential customers. Plus, developers are also given integrated tools for flexible billing, ensured version control, anti-cheating, anti-piracy, and lots of other features that place control into the hands of the content owner. For example, a developer can use Steam to beta test a game before making it available for purchase by gamers around the world. This flexibility really excites developers and publishers.'

Costikyan hopes that Manifesto and Steam won't just attract mainstream developers; he likes to think the viable market online distribution provides for unconventional games will lure developers out of the casual sector. 'There were many developers who were frustrated by the constraints of the conventional market,' he notes, 'and saw the success of the casual market. And they said, "Well, you know, these may not be the games I really want to make, but I have more creative freedom and control over what I do, and I have a chance of actually making money beyond development funding." So developers flocked to the casual market, and I think there's the potential for the same thing to happen to the independent games market ... but we don't have a *Bejeweled* yet, you know? And although Manifesto exists as a similar market for independent games, we're not putting out the same volumes of content that a casual distributor like Yahoo is. So it could be that the overall market has to expand considerably before we see this happening.'

Before a market such as Manifesto can



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The Central Committee's Choice:
Chocolate Castle

Miscellaneous | Retro

From: Lexaloffle Games

Clever Puzzle Game of Spatial Reasoning

I'm a sucker for an original and well-designed puzzle game, and *Chocolate Castle* certainly qualifies. Here's how it works: In each level, you have a number of little characters who eat chocolate, but each eats only one type (white, milk, dark, or rose), and eats only once. About the level are various blocks of chocolate; you have to clear a level. Blocks can be dragged about the level, but if a block of one color contacts another of the same color, they stick together permanently. One character can eat an entire group of chocolate of the same color. So you have to plan how to move your chocolate blocks to free up other eaters in such a way that everything gets eaten, given the geography of the level and the limited number of eaters you possess.

In short, it's primarily a game of spatial reasoning, which is unusual for a puzzle game. With three paths of increasing difficulty, 120 levels, and additional features (like exploding Turkish taffy) that appear on higher levels, *Chocolate Castle* offers quite a lot of gameplay, undoes and the ability to reset a level are helpful (no "show solution" option, however). And there's a level editor, and an increasing number of fan-built levels on the developer's site, so even if you finish the game, there's more stuff to do, if you like.

Worth checking out as an example of unusual (and clever) puzzle game design.

read more

SOAPBOX

Game Tunnel's Top 100 Indie Games
Submitted by costik on Tue, 2007-08-07 04:22.

Game Tunnel recently posted their Top 100 Games of the last 3 years, and it was interesting going down the list--both because, well, I'd put some games a lot farther down, and some a lot higher up... And in general, I think there's not enough attention paid here to wargames, adventures, turn-based strategy, and 'serious' games, and perhaps too much to fairly pedestrian shooters, arcade game retreads, and rather dull casual games. But interesting nonetheless, since Game Tunnel also focuses on indie games, and it's intriguing to see their somewhat different take on the field--and encouraging to see that almost half of the games in their "top 100" we carry.

#1: Mr Robot

#5: Mexican Motor Mafia

#6: Jets 'n Guns

#8: Outpost Kaloki

#9: Global Defense Network

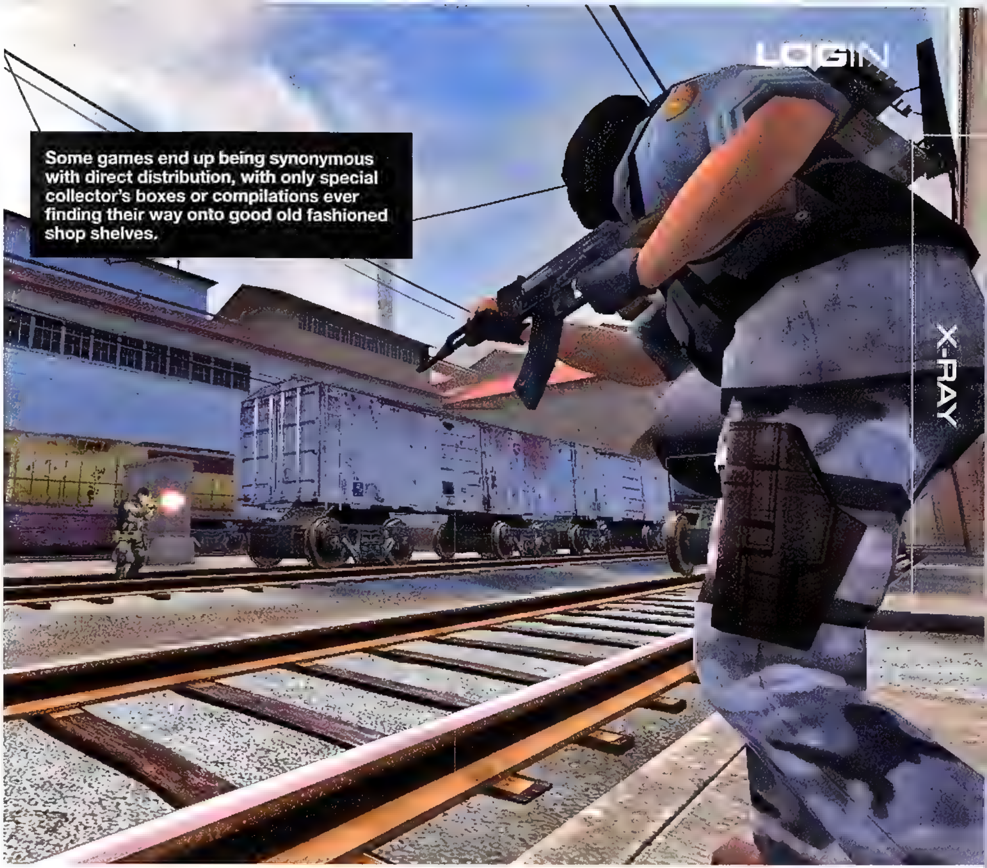
read more costik's blog login register

NEW GAMES

Kamyran's Eye 2
Retro | RPG | Turn-Based Fantasy

Mr. Robot
Cool Indie Games | RPG

▲ **Manifesto Games exists to help open the doors of commercial viability for smaller independant indie developers.**



Some games end up being synonymous with direct distribution, with only special collector's boxes or compilations ever finding their way onto good old fashioned shop shelves.

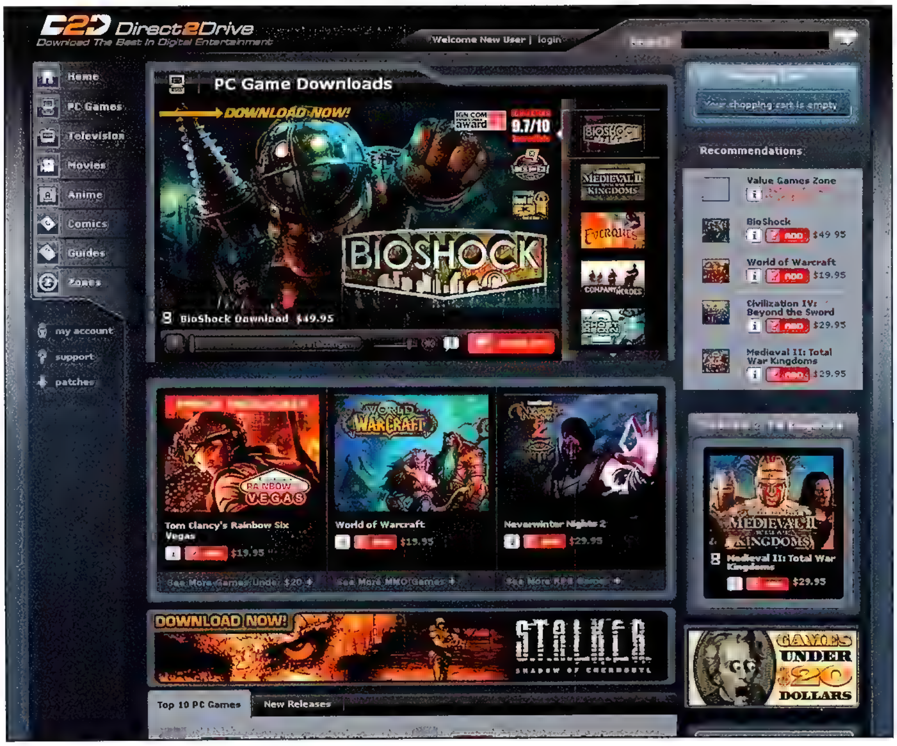
attract the amount of content to achieve this, consumers need to understand it. One of the ways of providing online distribution outlets with a stronger presence is to unite consumers through community features. Steam, by virtue of being a client application that also serves as a gateway to multiplayer matches with other players, is probably the most obvious example of this. But Valve wants to take it further.

'We keep an open mind about the direction of Steam,' Holtman says, 'an approach that has driven its evolution, in a relatively short timeframe, from a tool for automatically updating games to a platform for authenticating, purchasing, marketing, and distributing games. We incrementally debut new features and improvements as needed, or as customers request them. For instance, we've just debuted the Steam Community, a set of social and community features that top the most requested features from Steam users.'

Costikyan won't deny Steam's importance to the online distribution industry, but he thinks the feature that makes it so attractive to developers – its stable, installed userbase – is also a limiting factor. 'Steam is interesting technology,' he concedes, 'and, you know, their independent game offerings have been very helpful to a number of developers, and I think that's great. On the other hand, not everyone is going to download and install the Steam client, but just about everyone has access to the web. And in general, the fewer hoops you have to ask people to jump through to get products, the better. Steam has a large installed base of users that they can market games to, and that's great, but you're kind of locked into that existing audience of users. Somebody who's interested in indie games probably isn't going to download and install Steam. If they've already got *Half-Life 2* and like to play *Counter-Strike* and so on, though, then that's fine.'

Judging from Steam and Manifesto's successes, it would seem as if independent and otherwise unconventional developers really have no choice but to take advantage of this new market for interactive software. One UK-based independent company, Introversion Software, was arguably saved by Steam: its games enjoyed significantly improved sales once made available on the system; at retail, the company faced bankruptcy. Since signing on with Steam, Introversion's Darwinia, and now Defcon, have stayed at the top of Steam's charts. Regardless, Costikyan can't help but admit that the retail channel has some very important advantages: 'For one thing, review media tend to take things that appear in boxes more seriously, so it's easier to get attention that way. Added to that, just the fact that the box is sitting on a shelf in a store means it's kind of serving as a billboard for itself; it's being exposed to people who are presumably there because they want to purchase games. And even if they haven't heard about it from someplace else, they can still pick up the box and have a look. So, yes, the drawback of the website model is that, yes, a billion people can access your site, but trying to make them aware that you exist and have products they may be interested in isn't a trivial concern.'

In time, though, stores like Manifesto will invariably develop stronger presences on the web, as players become more accustomed to purchasing games digitally. Will this distribution channel supplant retail? Most think not; for bigger-budget games, it will undoubtedly be complementary. Independent software, however, will be hugely benefited by the availability of widely-viewed, widely-accepted online markets. And who knows? If enough gamers start buying games online, innovation might start looking a lot less pricey.



▲ **Direct2Drive is an offering from the enormous IGN network, a subsidiary of Big Rupert's Fox Interactive. Like anything IGN, page loading times are abysmal.**

The global machine

Ashton Mills sees the future, where all the world is one incredible machine.

For some time now we've had the impressive ability to distribute computing tasks across the world. Thanks to the net, and the fact that most machines connected to it spend their lives idling, projects like SETI (**setiathome.berkeley.edu**) and Folding (**folding.stanford.edu**) have enabled users to contribute to the greater (often) good.

In the beginning, this could only be taken advantage of by the few -- those that had both the bandwidth and CPU power to contribute since, sometimes, even the most friendly distributed computing clients could still had a habit of getting in the way when real work needed to be done. Frequently, people put old machines to good use as distributed nodes.

Today the proliferation of broadband and the advent of mulit-core CPUs casts a whole new light on the distributed computing paradigm. With high bandwidth caps and CPU power to spare -- aside from those times when a handful of games really put multiple-cores to good use -- it's easy to run a distributed computing client and just fire and forget it, never really noticing its load on your box.

It's also easy to forget we're witnessing a trend that actually heralds what we'll all be seeing and doing in the future: every computer on the net is a resource.

> “The single largest computing resource the world has ever seen, and it gets bigger every day.”

There's a gigantic volume of excess bandwidth and power in the world's connected machines at the moment that's almost completely underutilised. Distributed computing has shown us what it was possible when such machines are tapped into. There is, literally, the power of thousands of super computers just waiting to be secured, should the right application come along. This is more than just esoteric projects like SETI, in the future it's going to be about the actual infrastructure of internet services.

Bittorrent is a guide here -- as you YouTube has shown, video is hot property. Media companies would love to tie into this, but assuming the industry gets a clue and makes movies and TV instantly available to download or stream in high quality at a reasonable price, it simply wouldn't be able to handle the load with just a few data centers and gigantic pipes to the net. Not in a cost-effective manner, anyway. And why do that all when the distribution architecture is already there -- you can bet 'internet tv' users, when the time comes, will be both clients and distributors in global and local networks.

You can just imagine, for example, if internet TV became the norm in Australia (bugger free to air, all through the pipe instead) with millions of users 'tuning in' each day, mainstream channels could be downloaded in seconds or streamed realtime thanks to the sheer volume of users. You wouldn't even know a technology like bittorrent was in use.

And just think -- it's already possible to employ green energy technology in the home (solar, for e.g.) where, when you generate more power than you use, you can get credits against your power bill as your generated electricity is fed back into the grid.

There's no reason why distributed computing projects for your average home user, and not just geeks in the know, couldn't do the same with credits earned that could be applied against services. For example, the more your resources are used to distribute internet TV, the cheaper your service becomes.

Of course, that's a ways yet. The internet and the nodes of all the machines connected to it is the single largest computing resource the world has ever seen, and it gets bigger every day.

But you can lead the curve -- check out Wikipedia's entry (**en.wikipedia.org/wiki/List_of_distributed_computing_projects**) and BOINC (**boinc.berkeley.edu**) for projects to get involved with and donate some of those spare cycles and bandwidth. You've got yourself a multi-core beast, feed it and make a difference.

Ashton is a bit in the torrent of the future, buzzing like a cyclotron.

amills@atomicmpc.com.au

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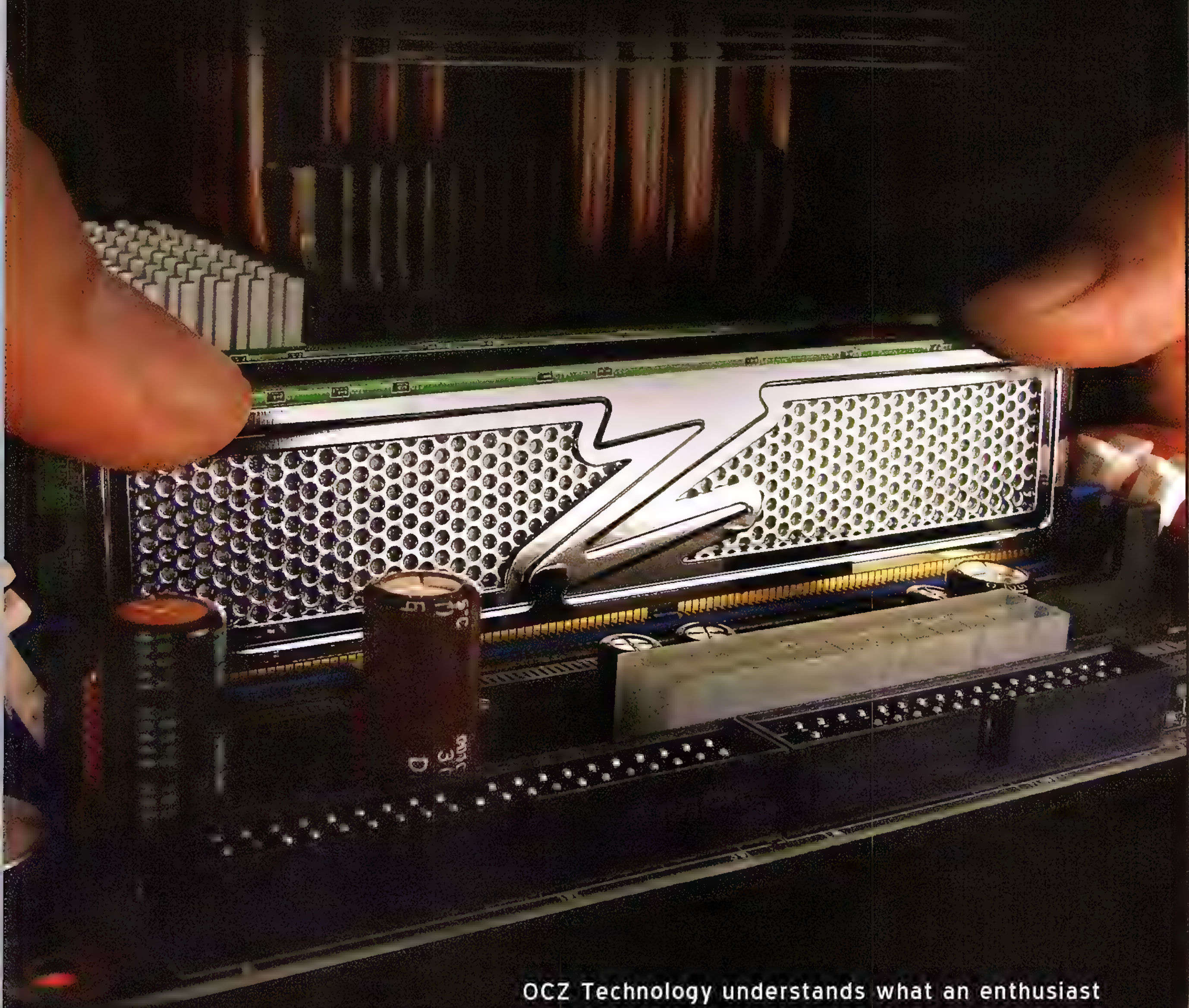

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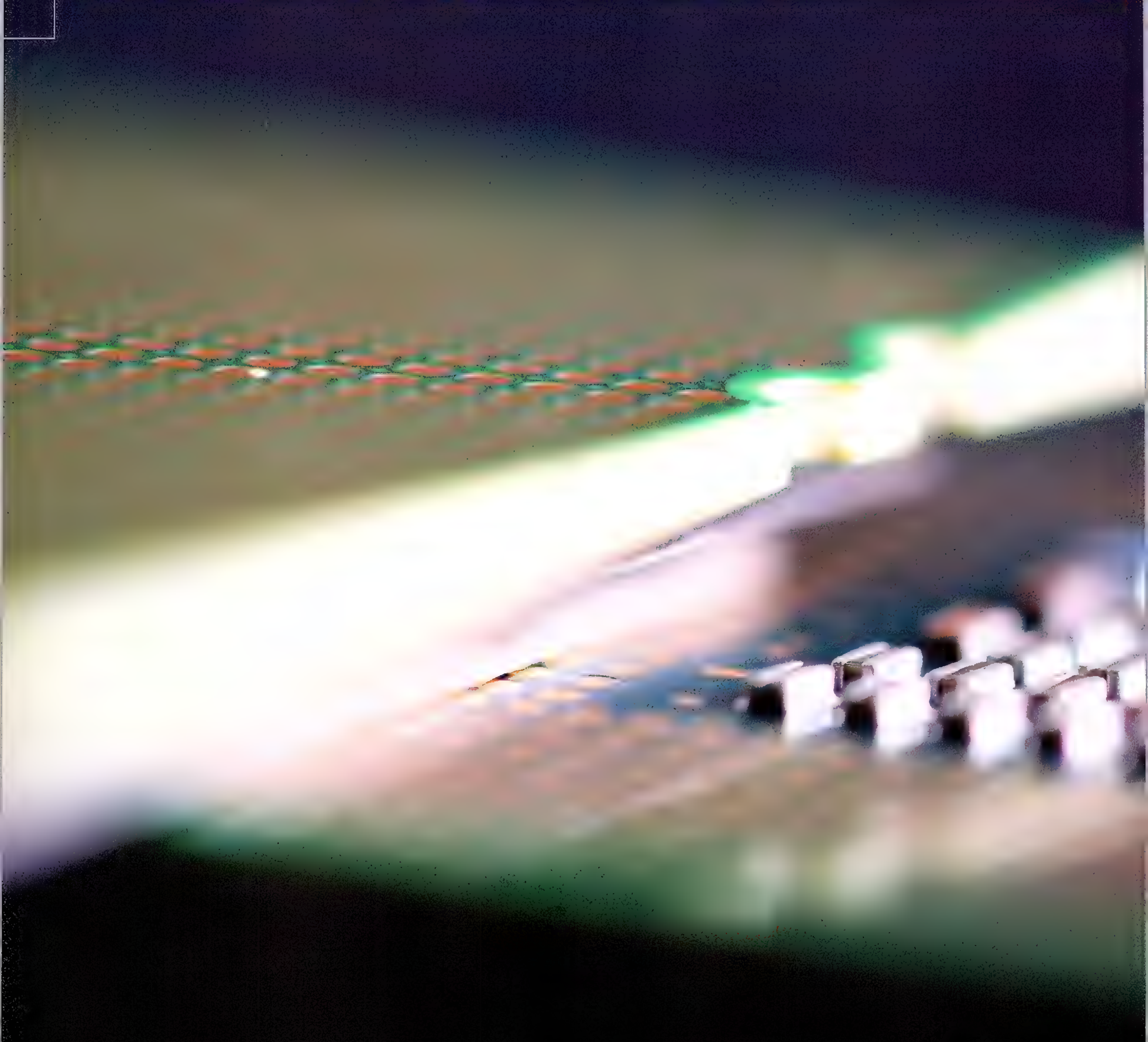


S AMD
T NIGHT

Josh Collins gets up close and personal with the good, the bad and the freakishly expensive from the two big players in the CPU market, AMD and Intel.

The past 12 to 18 months have been an exceptional and exciting time for the enthusiast CPU scene. We've seen a large bevy of hot hardware hit the scene over this period, including new micro-architecture, core revisions, new steppings, new chipsets and the introduction of more cores then we know what to do with.

Throw into the mix the consistent release, especially by Intel, of processors that overclock with such ease that even the newest of noobs can obtain a 20% to 30% overclock above stock specs. This will stand out for years to come as one of the most enjoyable times for the enthusiast.

To help guide future purchases, a selection of processors from both AMD and Intel have been brought together and pitched head to head. Read on to find out which ones are the goods and which ones are best left for the uninformed masses.

TESTED CPUS

INTEL

- Celeron 460
- Pentium E2160
- Core 2 Duo E4300
- Core 2 Duo E6600
- Core 2 Duo E6850
- Core 2 Quad Q6600
- Core 2 Extreme QX6850

AMD

- X2 4600+
- X2 6000+
- X2 6400+
- Dual FX-74 (socket F)

PROCESSOR CATEGORIES

For this article, the processors have been split into three groups:

- Budget
- Mid-range
- Extreme

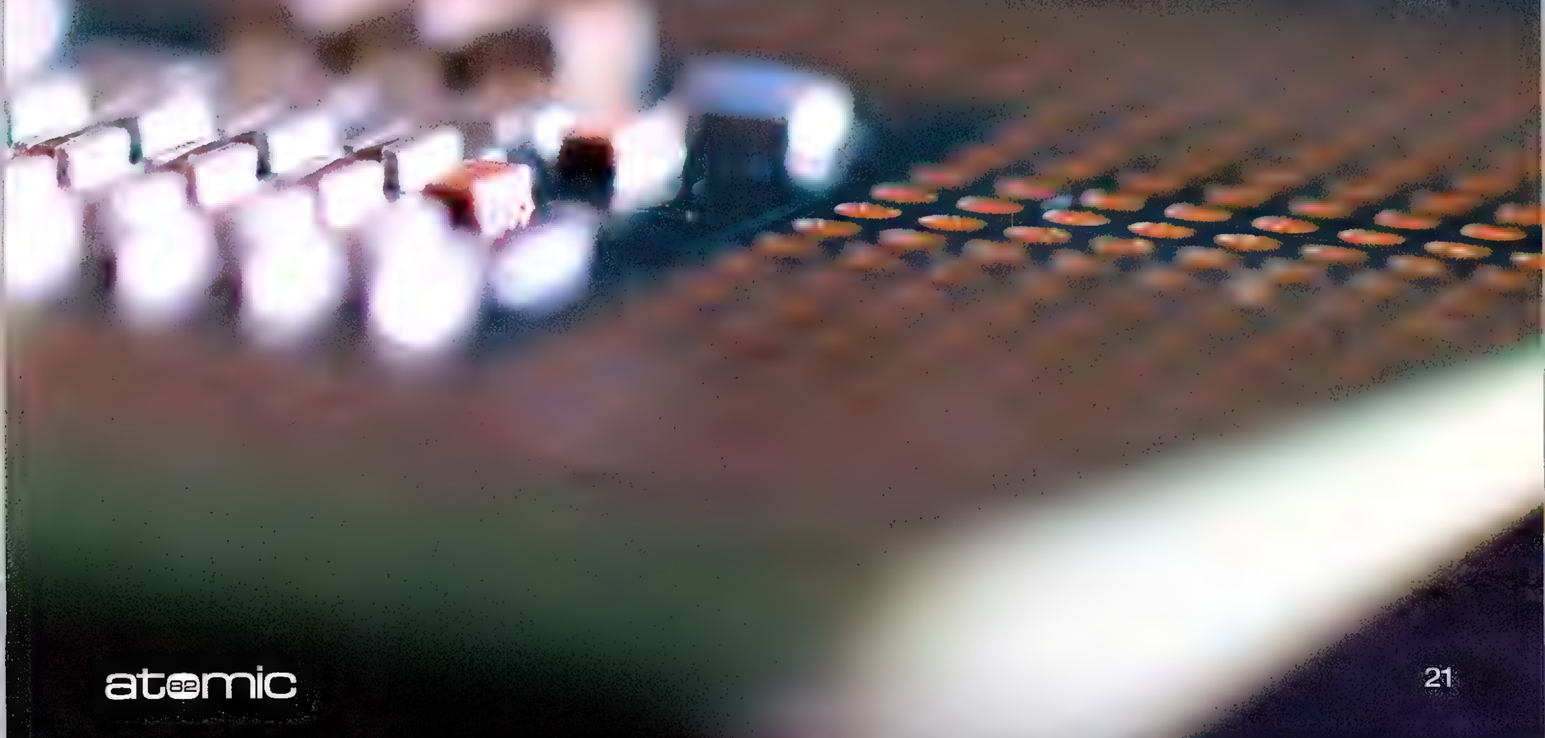
This will allow for a more accurate and clear comparison of processors within a given price range, and will also provide an understanding of general specification differences between the two poles of the pricing scale – from the cheap to the excessively expensive.

BENCHMARKS USED

For testing of these processors, we used the following benchmarks:

- 3DMark06 CPU tests
- Super Pi 4M
- wPrime 32M
- CineBench 10

All benchmarks were run using the standard Atomic Labs hardware as listed on the How we Test page (pg 34).



BUDGET

INTEL CORE 2 DUO E4300

Street price: **$156**
Number of cores: **2**
L2 Cache: **2MB**
Frequency: **1.8GHz**
Socket: **LGA775**
Manufacturing process: **65nm**
Front side bus: **200MHz**
Core code name: **Allendale**
Overclocking spectrum: **2.0GHz to 3.4+GHz**

INTEL PENTIUM E2160

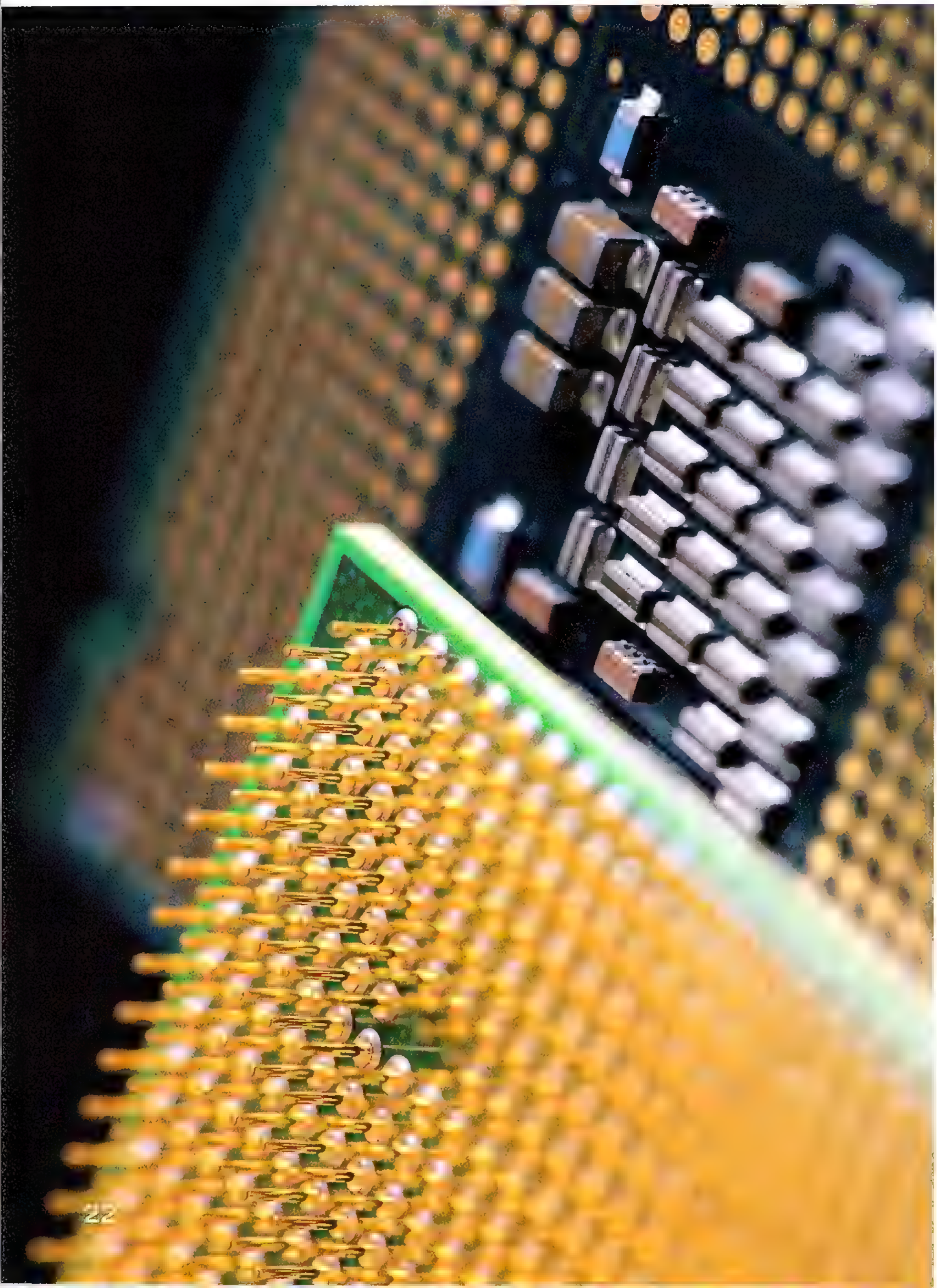
Street price: **$85**
Number of cores: **2**
L2 Cache: **1MB**
Frequency: **1.8GHz**
Socket: **LGA775**
Manufacturing process: **65nm**
Front side bus: **200MHz**
Core code name: **Allendale**
Overclocking spectrum: **2.0GHz to 3.0+GHz**

AMD X2 4600+

Street price: **$138**
Number of cores: **2**
L2 Cache: **512KB**
Frequency: **2.4GHz**
Socket: **AM2**
Manufacturing process: **90nm**
Front side bus: **200MHz**
Core code name: **Windsor**
Overclocking spectrum: **2.5GHz to 3.0+GHz**

INTEL CELERON 460

Street price: **$79**
Number of cores: **1**
L2 Cache: **512KB**
Frequency: **2.4GHz**
Socket: **LGA775**
Manufacturing process: **65nm**
Front side bus: **200MHz**
Core code name: **Conroe-L**
Overclocking spectrum: **2.4GHz to 3.6+GHz**



The budget sector is, always has been and in all likelihood will continue to be, an extremely intense area of the market. Often only a few dollars are the difference between the choice of processor A over processor B. This competition exists because the budget sector is where mass product movement occurs - this is the bread and butter for Intel and AMD.

Over the past 12 to 18 months we've seen AMD's strength, influence and brand weighting shift from its past king of the hill crown and mid range warrior status, to being a budget bargain. This undeniably was caused by the performance and subsequent success of the Core micro-architecture based Intel processors, specifically the Core 2 Duo range.

However, in this new budget orientated environment, AMD has thrived. For the past 12 months, it has been offering the X2 4600+, a competent and strong performing processor at a very accessible and competitive price point.

It appears that Intel now feels comfortable in the extreme and mid-range sectors, and is coming after the budget sector and holding nothing back. After recent price drops and continued release of new chips, especially within the budget price point, this could lead to dangerous times for AMD.

When put head to head, we found strong reason for AMD to be worried. Twelve months ago, Intel's Core micro-architecture, commonly referred to then by the development code names 'Conroe' and 'Allendale' (for the chips with less cache), hit hard on the extreme and mid-range markets. They were well situated in the budget sector with the then recently price reduced X2 line up, against the older Netburst based Pentium 4, Pentium D and Celeron D series.

In recent months however, this has all changed rather dramatically. With the release of the Core 2 Duo E4000 series, then followed by the release of the Pentium E E2100 series, and again another budget release in the form of the Celeron 400 series. All of these are based on the Core micro-architecture.

AMD has now been attacked in the area that, since the Core 2 Duo release, had become their home base. Locked in from all angles, the fight is on between AMD's low price yet aging X2 range, and Intel's Core-based new-school budget blasters.

A TREND EMERGES

With a selection of samples from this sector, we found some intriguing results.

There was a mixed vibe with regards to the best value processor from this round up. The two contenders for this crown being the Celeron 460 and the Pentium E2160.

The Conroe-L based Celeron 460 struck a core (excuse the pun) with our inner geek as we reminisced on the Celeron 300A of years gone by. This chip, like its legendary predecessor was an awesome overclocker and, at stock, out performed the E2160 in single threaded tests – we can only put this down to efficiency as the single core obviously doesn't juggle a single thread between two cores.

On the flip side was the E2160, with more cache, an additional core and also a capable overclocker. With the additional core available, this processor is set to take on the future multi-core optimised programs that we like to see… well soon, I guess.

Seeing as it is the budget value solution, the Celeron 460 earns strong merits, yet the E2160 has a more logical reasoning driving its possible purchase – so to this extent, it will come down to user preference.

For the performance crown, this was undeniably earned and then owned by the X2 4600+. Note that the Super Pi graphs don't show this, but this is a known Achilles' heal of the Athlon64 micro-architecture in comparison with the Core micro-architecture. In the performance stakes, the X2 4600+ offered a good return on the dollars spent.

BUDGET VERDICT

Performance: AMD X2 4600+
Value: Intel Celeron 460 or Intel Pentium E2160 dependent on multi-tasking capability

MID-RANGE

INTEL CORE 2 DUO E6600

Street price: **$297**
Number of cores: **2**
L2 Cache: **4MB**
Frequency: **2.4GHz**
Socket: **LGA775**
Manufacturing process: **65nm**
Front side bus: **266MHz**
Core code name: **Conroe**
Overclocking spectrum: **3.0GHz to 4.0+GHz**

INTEL CORE 2 DUO E6850

Street price: **$342**
Number of cores: **2**
L2 Cache: **4MB**
Frequency: **3.0GHz**
Socket: **LGA775**
Manufacturing process: **65nm**
Front side bus: **333MHz**
Core code name: **Conroe**
Overclocking spectrum: **3.2GHz to 4.0+GHz**

INTEL CORE 2 QUAD Q6600

Street price: **$330**
Number of cores: **4**
L2 Cache: **8MB**
Frequency: **2.4GHz**
Socket: **LGA775**
Manufacturing process: **65nm**
Front side bus: **266MHz**
Core code name: **Kentsfield**
Overclocking spectrum: **3.0GHz to 4.0+GHz**

AMD X2 6000+

Street price: **$205**
Number of cores: **2**
L2 Cache: **512KB**
Frequency: **3.0GHz**
Socket: **AM2**
Manufacturing process: **90nm**
Front side bus: **200MHz**
Core code name: **Windsor**
Overclocking spectrum: **3.2GHz to 3.4+GHz**

AMD X2 6400+

Street price: **$328**
Number of cores: **2**
L2 Cache: **512KB**
Frequency: **3.2GHz**
Socket: **AM2**
Manufacturing process: **90nm**
Front side bus: **200MHz**
Core code name: **Windsor**
Overclocking spectrum: 3.3GHz to 3.5+Ghz

The mid-range, what a beautiful place to be in today's processor market. With big blue and the green taking no prisoners in a fight that has the potential to shape the processor market for years to come, the competition between these giants has had a very strong and amazingly positive impact upon pricing for the general consumer.

In the past the mid-range would be seen as the $300 to $700 price bracket. Thanks to the fierce competition, this has lead to the mid-range price field being lowered to a range between $200 and $400. This is great news for the average buyer, and a period of joy and play-time for the enthusiast. Now hard decisions are being met by some with an answer of 'oh well, I'll just buy both and have some fun'.

This joyous time is one that many expected to only last for a short time, a couple months at the most. But multiple price drops and the release of new series of processors into an already packed market continues to keep prices down.

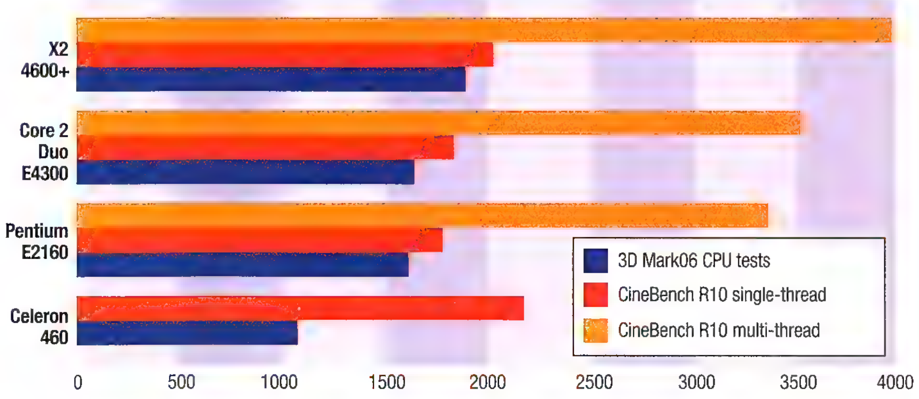
The most recent set of price drops brought in a new player to the mid-range sector, the Core 2 Quad Q6600 quad core processor. It made quad core technology more affordable to a wider market of consumers, most notably the enthusiast overclockers and gamers.

The introduction of a four core processing beast to the mid-range market has created uncertainty in the minds of many. What's better - a higher frequency dual core processor, or a slightly lower frequency quad core? Well let's look at what adds up to get there.

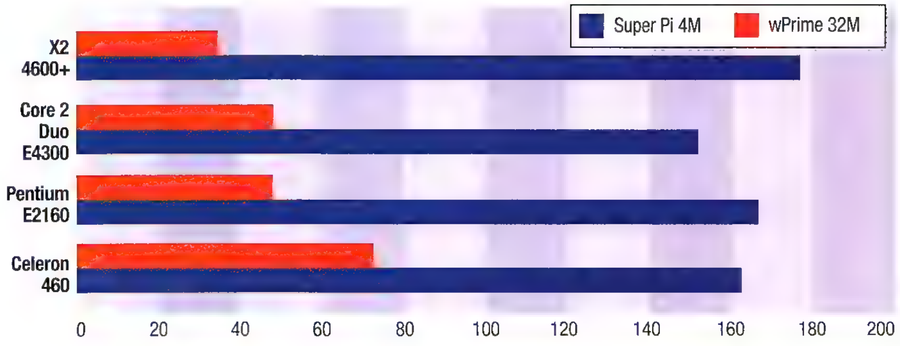
The fact of the matter is that at this point in time, the fight can be any body's – having the potential to swing either way and all depending on the willingness of the user to either overclock or not. Additionally, if the choice to overclock is made, the next question that begs attention is defining just how far to go.

The value chip is undoubtedly the Intel Core 2 Quad Q6600. This chip offers admirable performance in single threaded applications and excels in multi-threaded processing. Add to this strong foundation, the chips are well known for being strong overclockers with 3GHz to 3.3GHz being easy to achieve and many overclockers with a little more knowledge and understanding of a system hitting

CPU 3DMark06 and CineBench R10 results (higher is better)



SuperPi 4M and wPrime 32M results (lower is better)



THIS IS THE RANGE OF UNADULTERATED, FREAKISHLY FAST PERFORMANCE. THIS IS, WITHOUT ANY DOUBT, THE EXTREME END OF THE SPECTRUM

anywhere between 3.4GHz to 4GHz on quality air cooling or water cooling. With the help of sub-ambient cooling, these processors hold within them the potential to reach quite considerably beyond the 4GHz mark on all four cores.

Taking out the performance medal is the Intel Core 2 Duo E6850. With the large majority of applications still being single threaded code, the E6850 utilises its raw processing power (frequency) to crunch the numbers. If you're looking for a strong gaming processor as well as a strong dual core overclocking processor, the E6850 takes the cake.

The AMD processors in this sector, the X2 6000+ and X2 6400+, both performed admirably and offer good value for money, particularly the X2 6000+. Unfortunately, these processors are not the greatest overclockers, as they're quite close to the physical limitations of the Athlon64 micro-architecture. As such, the Core 2 Duo and Core 2 Quad lines from Intel offer greater potential for the money invested in them.

A fair effort from AMD and still worth considering for a stock system, but for an enthusiast system, they just fall short of power potential held within the Intel Core line-up.

MID-RANGE VERDICT

Performance: **Intel Core 2 Duo E6850**
Value: **Intel Core 2 Quad Q6600**

EXTREME

INTEL CORE 2 EXTREME QX6850

Street price: **$1349**
Number of cores: **4**
L2 Cache: **8MB**
Frequency: **3.0GHz**
Socket: **LGA775**
Manufacturing process: **65nm**
Front side bus: **333MHz**
Core code name: **Kentsfield**
Overclocking spectrum: **3.2GHz to 4.0+GHz**

AMD FX-74 (DUAL PROCESSOR SYSTEM)

Street price: **$620**
Number of cores: **2 per CPU, 4 cores total**
L2 Cache: **2MB**
Frequency: **3.0GHz**
Socket: **Socket F**
Manufacturing process: **90nm**
Front side bus: **200MHz**
Core code name: **Windsor**
Overclocking spectrum: **3.1GHz to 3.3GHz**

This is the range of unadulterated and freakishly fast performance. This is, without any doubt, the extreme end of the spectrum and where the big boys from both camps come out to play… violently!

In the extreme high-end sector we have the Intel Core 2 Extreme QX6850 and the AMD 4X4 dual FX-74 based system. Two radically different concepts on the quad core solution with interesting attributes.

The dual FX-74 system is simply sexy – any enthusiast geek will tell you that multi-processor systems quite simply have an aura that, whilst unexplainable to the lay-man, hold respect within the geek circles. There is quite simply something special about two processors working in tandem to create a unified beast.

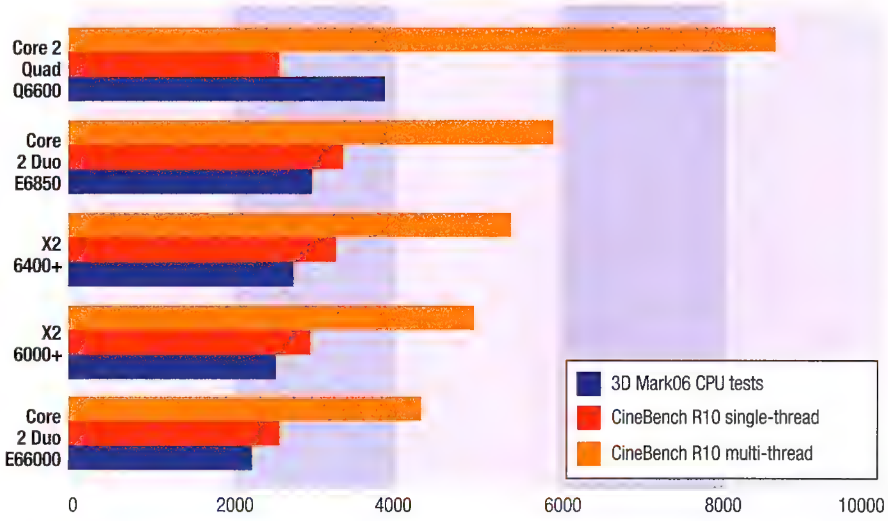
Whether this love for multi-processor systems stems back to many of our child hood (and often still current) years spent entranced by the likes of animations such as *Transformers* and *Voltron*, it's not quite clear, but damn they're cool.

Unfortunately for AMD, Intel's singular solution that is the Core 2 Extreme QX6850, like *Prime*, can shoot down the AMD Devastator with a single blow.

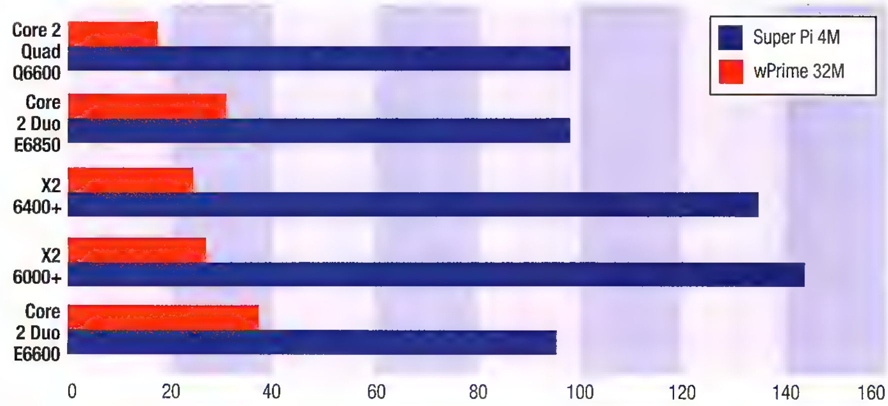
The first problem for AMD is that support for the 4X4 platform is poor to begin with, ASUS being the only one offering a true enthusiast platform offering (BIOS overclocking options etc). However, due to the nature of the dual processor system, there are complications with the proper handling of memory allocation for each processor and other such dual processor foibles that plague them from being a feasible true desktop solution.

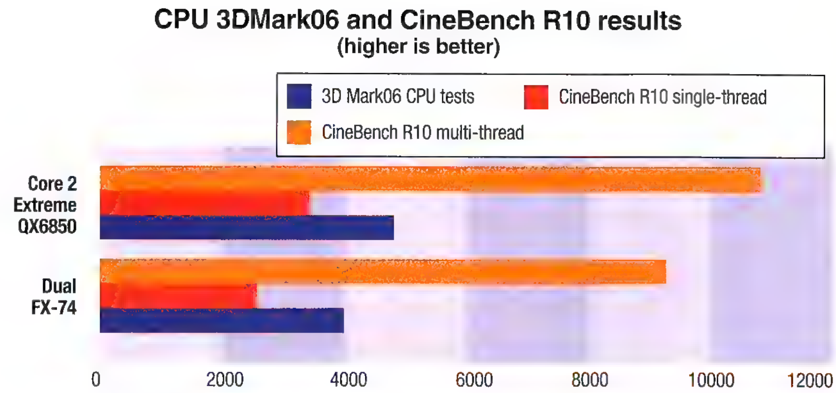
In our testing, the highest memory divider

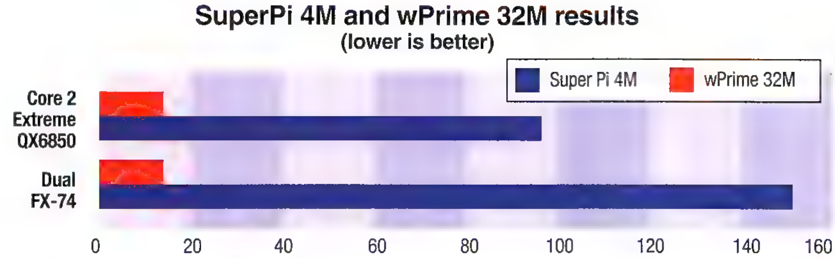
CPU 3DMark06 and CineBench R10 results (higher is better)



SuperPi 4M and wPrime 32M results (lower is better)




CPU 3DMark06 and CineBench R10 results
(higher is better)


SuperPi 4M and wPrime 32M results
(lower is better)

available, like the Athlon64 X2 series, was DDR2-800. Unfortunately, due to the motherboard and processor combination, we were only able to benchmark at 5-3-3-8 latencies, a far cry from the 3-3-3-8 used on the X2 series and even further from the DDR2-1000 4-4-4-10 used for the Core 2 Duo processors but this does represent some of the positives and negatives of each platform.

Add to the memory issues that the Core micro-architecture is a more refined and powerful beast and the dual FX-74 4X4 system really had its work cut out for it. As many would expect, Intel's Core 2 Extreme QX6850 quite simply wiped the floor with AMD's offering.

Beaten across the board, with the exception of a close win over the Core based quad in the wPrime 32M result, the dual FX-74 system was otherwise generally left for dead.

With the extreme high-end sector being the cut throat premium of both brands, Intel took out the crown with confidence. How long this confidence stands though, we don't know, as the Barcelona-based AMD Phenom desktop processors are just around the corner… but then again, so are Intel's Yorkfield quads. Fun times ahead, indeed.

EXTREME VERDICT

King of the hill: **QX6850**

CONCLUSION

Both camps have their horns locked and want to be #1. We just hope the battle stays (relatively) clean and that the consumer scores a strong and positive result from it.

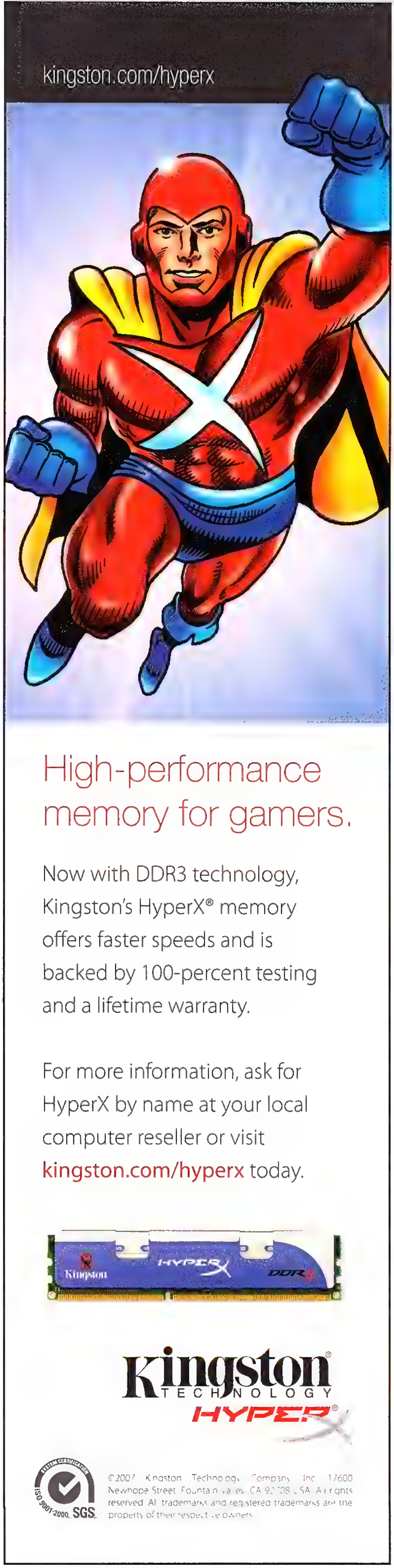
Intel are preparing the launch of their 45nm processors in Q4 '07 and Q1 '08 in the form of the Penryn mobile processors, Wolfdale dual core processors and Yorkfield quad core processors based on a slightly updated Core micro-architecture. To follow this up and continue on with Intel's 'tick-tock' development scheme, we're scheduled to see the 32nm Nehalem micro-architecture hit the market at the end of '08.

With strong results from the Yorkfield quad cores already being made public by Intel at their IDF conference, the chip giant is looking good to continue its strength within the enthusiast market.

There are a lot of question marks surrounding AMD at the moment. Many enthusiasts, of which a large number were strong AMD believers for some time throughout the Athlon64 dominance, are left wondering as to whether AMD are going to regain prior glory with the Phenom desktop release, or continue to try and claw back into whatever sector Intel aren't actively attacking.

AMD has done well in the chipset and graphics processing areas of late, however there is some worry as to whether its processors are up to the task of taking on Intel. For the sake of the consumer and competition within the market, we hope that AMD strike back, and with some true weight, to hit Intel hard with its upcoming Phenom desktop release.

Exciting time now, and in the months ahead! In the meantime, enjoy the bounty of amazingly powerful processors within today's market place!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DE

Extreme

EP CHILL

overclocking and cooling

Josh Collins opens his arms wide and embraces the cold; it is your key to unlocking untold performance!

A Core 2 Duo E6700 and a Core 2 Quad QX6850, together will embark on a journey, with you, into the world of the cold… the very freakin' cold. In this world of sub-zero temperatures each CPU will be overclocked to see which cooling method is the ultimate, taking the systems to new heights of enthusiast computing performance.

Sub-zero, but why?

It's a known fact, and has been for many decades, that a processing unit can only go as fast as the thermal design allows. Well, what if this problem could be reduced, better yet, what if this problem could be completely removed? This was the type of thought process that carved out an intriguing niche of the enthusiast sector. What if we could reach the maximum potential of an electronic micro-architecture? What if, we could break through the known boundaries and access performance previously unobtainable? This, is going sub-zero.

The four horsemen of the overclockalypse

There are varying degrees of cooling methods across the spectrum, from the stock air cooling through to the truly extreme. There are four methods that hold the ultimate claim to fame as the most powerful, brutal and effective:

- SINGLE STAGE VAPOUR PHASE CHANGE COOLING
- DRY ICE ('DICE') COOLING
- CASCADE VAPOUR PHASE CHANGE COOLING
- LIQUID NITROGEN COOLING

HARDWARE SELECTION

Extreme overclocking places special demands on ordinary PC components.

Motherboard

- High FSB overclocking potential
- Capable of efficiently and effectively overclocking memory i.e. capable of DDR2-1200 frequencies
- As simplistic as possible socket area, preferably with digital PWM used rather then capacitors
- Capable of functioning below zero degrees Celsius
- Capable of reading sub-zero temperatures accurately
- High voltage ranges available on CPU vcore, NB/MCH vcore, memory vdimm, FSB vcore etc
- Stable and accurate power supply to system resources i.e. 1.6v CPU vcore is an accurate 1.6v and not a realistic 1.56v
- Small and varied increments in system voltage adjustments
- Strong memory divider functionality

Processor

- Capable of withstanding and functioning in negative temperatures
- Potential to reach a high FSB
- Scales well with added voltage
- Has a high air/water cooled overclock relative to other processors of its kind

Memory

- Capable of DDR2-1000+ frequencies so as to at least match the FSB in a 1:1 ratio
  - Should be capable of high frequency with tight timings, i.e. DDR2-1100 4-4-4-12
- To take the fullest possible advantage of the overclocked system, the memory should be capable of running a memory divider to force much higher memory clocks at a given FSB. For example, a 2:3 ratio on a 400FSB to force a DDR2-1200 frequency or a 4:5 ratio on a 500FSB to force a DDR2-1250 frequency
- Capable of scaling well with additional voltages

Power supply unit

- High amperage rails
- Preferably a single high amperage rail solution
- Sufficient wattage for the hardware being overclocked
- 12v, 5v and 3.3v rails capable of maintaining as close as possible to their specified voltages whilst under load

The Atomic sub-zero test bed

For the labs sub-zero testing, we've chosen to utilise the following hardware as our test bench:

- ASUS Blitz Formula
- Corsair Dominator PC2-10000
- Enermax Galaxy DXX 1000W
- Intel Core 2 Duo E6700
- Intel Core 2 Quad QX6850
- Western Digital Raptor HDD

Truly Atomic coolers

For our testing we've utilised four of the most insane cooling solutions in Australia to test the true extent of today's hardware capabilities. The mind blowing cooling solutions used are:

- Custom built single stage vapour phase change cooling unit
- Custom built two stage cascade vapour phase change cooling unit
- Custom built dry ice/liquid nitrogen copper and aluminium cooling pot

And now, to these awe inspiring cooling solutions.

You'll be seeing more of the Frozen Cascade.

Atomic has purchased the Frozen Cascade, it now lives in our labs alongside Chernobyl, and will feature regularly as we clock the bejesus out of new CPUs in future issues of Atomic.

This cooling unit offers cooling potential close to that of liquid nitrogen but on a consistent and more easily controlled level. This is, without any doubt, the ultimate in consistent, measurable and controlled sub-zero cooling available to any enthusiast. Atomic owns it, and you can see it at Live 07!

SINGLE STAGE VAPOUR PHASE CHANGE

MULTIPLE STAGE CASCADE VAPOUR PHASE CHANGE

SINGLE STAGE VAPOUR PHASE CHANGE COOLING

Initial cost: $1,010 for retail unit, $850 to $1,200 for custom unit

Ongoing cost: No direct costs, slight increase in system power usage

Cooling hardware needed: will also require sufficient insulation equipment

Temperature: -10°C to -50°C dependent on load heat and cooler design

Possible CPU temperature: +10°C to -45°C dependent on the CPU waste heat output

Hardware risk: With proper insulation; low. With insufficient insulation; high

Personal risk: None within the realm of regular usage

Daily solution: Yes

Average CPU overclock possible: 3.8GHz to 4.5GHz for a Core 2 Duo, 3.8GHz to 4.2GHz for a Core 2 Quad

Restrictions: Case selection will be dependent on the inclusion of the suction-line within the system

Other uses within enthusiast computing: Can be used for chipset and/or GPU cooling

Tips and tricks: To obtain cooler temperatures at the evaporator head, take the side panel off of the unit and allow for airflow past the compressor. The cooler the compressor operates, the colder the evaporator head temperatures will be!

Maximum overclock obtained on E6700: 4,749MHz
Maximum overclock obtained on QX6850: 4,734MHz

Holy frosted hell Batman! how does this work?

The most simplistic way to describe the mechanics of a vapour phase change cooling unit is to draw the common concepts between it and an ordinary household fridge.

A fridge operates in a way that the compressor, funnily enough, compresses gas to a liquid state and then pumps these gases through an element (the inside area of the fridge) where it then boils at sub-zero temperatures and evaporates into a gas. It is this change in state that allows for the cooling of the element. This element in effect cools the interior of the fridge.

Once these compressed liquids have transformed into a gas, they then run through a condenser which, as its name infers, condenses the gas so that the compressor may again compress the refrigerant ready to be circulated throughout the system yet again.

This is, in essence, what is occurring in a vapour phase change cooling unit for a computer. The only difference is that the element within a fridge is very large and therefore the focus of the vapour phase change (state transformation) occurs over a larger medium and temperatures are between just below ambient to -4°C for the likes of the freezer.

A computer vapour phase change unit uses a compressor and condenser, as does a fridge, but rather than using a large heat exchange element like the fridge, this method of cooling focuses the cooling onto a much smaller cooling block, known as the evaporator head. This is commonly simply referred to as the evap-head. The contact area of the evap head that meets the heat source is generally about the size of a fifty cent coin.

This focused use of the vapour phase change process allows for much lower, direct and manageable temperatures.

MULTIPLE STAGE CASCADE VAPOUR PHASE CHANGE COOLING

Initial cost: $2,500 for two stage cascade, additional cost for additional stages

Ongoing cost: No direct costs, slight increase in system power usage

Cooling hardware needed: will also require sufficient insulation equipment

Temperature: -75°C to -120+°C these temperatures are dependent on the design, efficiency and number of stages used in the unit as well as the gas types used

Possible CPU temperature: -70°C to -100+°C

Hardware risk: With proper insulation; medium to low. With insufficient insulation; extremely high

Personal risk: These units, like the smaller single stage versions, are relatively risk free, however if building a custom unit, extreme caution needs to be taken to meet safety standards during the building stages and also during the operational stages

Daily solution: Yes – however can be quite loud and temperatures will decrease slightly after hours of use

Average CPU overclock possible: 4.5GHz to 5.0+GHz for a Core 2 Duo, 4.4GHz to 5.0+GHz for a Core 2 Quad

Restrictions: Like their smaller single stage brothers, a cascade can be paired with a case however modifications will need to be made to the case as well as allowance for the suction line within the case internals whilst the side panel is on. Another restriction is the size of these units, due the nature of the beast, the units can very quickly become considerably sizeable as stages are added

Other uses within enthusiast computing: Can be used for chipset and/or GPU cooling, though not likely to be used on a chipset as it would be excessively cold.

Tips and tricks: To avoid frosting around the socket and the processor due to the extreme temperatures, there are a number of tricks. These tricks include, though a not limited to assuring an airtight seal between the processors/socket and the evap head, using rear heating elements on the back of the board, using dielectric grease or Vaseline in the socket itself and also assuring the system is consistently putting out a strong heat source. For the last point, consider running programs such as wPrime whilst in an idle period between benchmarks.

Maximum overclock obtained on E6700: 5,003MHz
Maximum overclock obtained on QX6850: 4,952MHz

Holy Antarctica, Batman! How does this work?

As with many of the characteristics and functionalities of a cascade, they're simply an advancement or evolution of the concepts behind the single stage units.

The concept of a multiple stage cascade unit, as its name implies, is that there is a cascade effect of the cooling to achieve a super-cooled circulation resulting in much lower temperatures.

In a dual stage solution, the first stage compresses the gas, instead of then going through the suction line to the evap head, it instead cools the second compressor. With the second compressor cooled by the first stage, the second stage can now super-cool the gas within the circulatory system of the second stage, this in return gives much lower temperatures.

A+CASE
Brought to you by Tagan

EL DIABLO
The Devil's in The Details

CS-EL Diablo BM

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DRY ICE COOLING

Initial cost: $200-$300 for a CPU pot

Ongoing cost: Dice is a single use item, this means each session will have cost dependent on the amount of dry ice used

Cooling hardware needed: Dice pot, mounting plate, mounting nuts and bolts, sufficient insulation, heatsinks if necessary for areas such as MOSFETS, memory ICs etc

Temperature: -75°C to -65°C dependent on the cooling efficiency of the pot used and the quality of the mount between the CPU and the pot

Possible CPU temperature: -70°C to -30°C dependent on the CPU waste heat output

Hardware risk: With proper insulation; medium to low. With insufficient insulation; very high

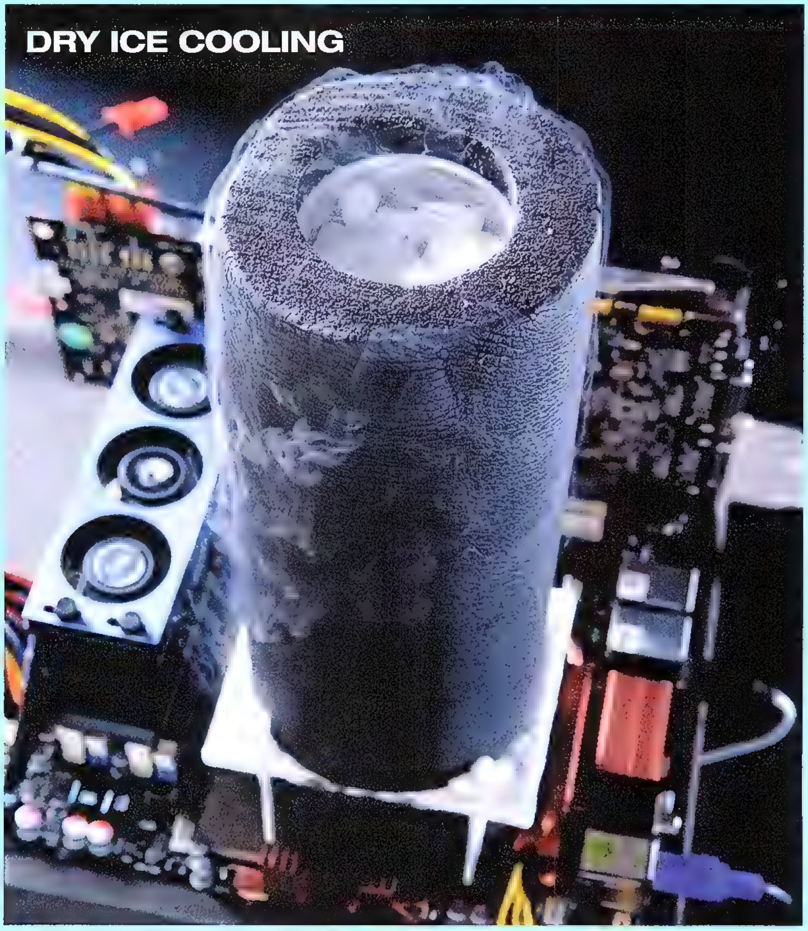
Personal risk: Possible cold burns if handle inappropriately and for longer then a few seconds. Atmospheric changes can result in a carbon dioxide heavy environment, be sure to plenty of ventilation. If starting to feel light headed or sleepy, immediately leave the room and go outside for some fresh air. Follow this up by ventilating the room in question.

Daily solution: No

Average CPU overclock possible: 4.4GHz to 5.0+GHz for a Core 2 Duo, 4.2GHz to 4.9GHz for a Core 2 Quad

Restrictions: The system generally needs to be on a test bench and setup outside of any case enclosure. This is a session based solution and requires more preparation then vapour phase change cooling.

Other uses within enthusiast computing: Can be used for chipset and/or GPU cooling



Maximum overclock obtained on E6700: 4,955MHz
Maximum overclock obtained on QX6850: 4,841MHz

Holy frozen Jupiter Batman! How does this work?

Dry ice, or as us trendy overclockers love to call it, dice, is the solid form of carbon dioxide. The carbon dioxide (CO2) gas is compressed and when compressed, forms a solid ice state. This ice is commonly gathered in different forms. These forms include blocks, pellets, shavings or ice dust. The most commonly used form by overclockers is the pellets.

The dry ice is used in conjunction with a metal tube firmly attached to the heat source. With the tube braced down upon the CPU and filled with dice, the next step is to use a small amount of alcohol (1cm within the tube), for example acetone, to bridge the connection between the dice and the inner walls of the tube. This allows for optimum heat transfer and control.

LIQUID NITROGEN (LN2) COOLING

Initial cost: $200-$300 for a CPU pot

Ongoing cost: As with dice, LN2 is a single use, session based cooling method. This means there will be an ongoing cost dependent on the amount of LN2 used during a given session.

Cooling hardware needed: LN2 pot, mounting plate, mounting nuts and bolts, sufficient insulation, heatsinks if necessary for areas such as MOSFETS, memory ICs etc

Temperature: -196°C

Possible CPU temperature: -100°C to -170°C dependent on the heat load

Hardware risk: With proper insulation; medium. With insufficient insulation; extremely high – additionally any liquid spilt on components generally results in failure of that component

Personal risk: High – take extreme precautions when handling this substance. As much as there are some fun tricks that can be done with LN2, it is not a toy and is not to be treated as such.

Daily solution: No

Average CPU overclock possible: This is the king. The maximum overclocks are obtained using LN2 and this solution is considered the final frontier. 4.7GHz to 5.0+GHz for a Core 2 Duo, 4.6GHz to 5.0+GHz for a Core 2 Quad

Restrictions: It is a volatile substance and also due to the method in which it is used to cool components, the system will need to be placed outside of a case as a bench test system. Also note that a certified Dewar flask is necessary for obtaining the liquid and transportation must be in the rear of a vehicle such as a Ute and cannot be inside a vehicle such as on the back seat of a sedan.

Other uses within enthusiast computing: Used for cooling overclocked and over volted GPUs. Potential to be used for chipsets, however the extreme cold is an unnecessary amount of cooling for chipsets.

Tips and tricks: Some of the best overclockers in the world swear by the method of putting a very small amount of LN2 in the tube and then followed by a small amount of water. This then instantly freezes and creates a barrier between the copper base and liquid nitrogen, effectively allowing greater control of the temperatures obtained whilst using the cooling method.

Maximum overclock obtained on E6700: 5,000MHz
Maximum overclock obtained on QX6850: 4952MHz

Holy cryogenics Batman! How does this work?

As you'll no doubt have noticed, liquid nitrogen has an amazingly low temperature whilst in a liquid state. This is, with no doubt, the ultimate and most awe inspiring method of cooling a PC.

The theory behind how this cooling method works is really quite simple. At such a cold temperature and paired with a heat conductor such as copper, the cooling method is capable of super-cooling the heat source, in the standard situation this is a CPU, to temperatures ranging between -170°C to -100°C. The sweet spot for this solution is between -150°C and -110°C and will vary between different hardware.

Due to the constantly evaporating nature of liquid nitrogen, paired with the extremely cold temperature being strapped on what is by this stage an overclocked heat dumping beast, the operating die temperature of the processor can spike radically within a given temperature range. This is commonly referred to as temperature swing.

The more this swing effect is controlled, the greater overclocking experience will be obtained. If the temperature swings too violently, the system can cease to operate, even if the processor is within a temperature range that it is known to otherwise operate. Such violent swings, such as from a high point of -80°C (full load) to a low point of -160°C (post load idle) in a number of seconds can disrupt the signals within a processor. This effectively renders a fatal error that will make the processor cease to operate until it is thawed out.

The journey to below and beyond

You may ride the towering peak of success and high frequency madness, or you could experience the trough of despair as you fall well short of your goals and ambitions or, worst yet, suffer a hardware failure. But this is the sub-zero game we play, it's playing with fire. Ice cold fire.

For those who build their own PCs, knows quality power supplies. NVIDIA and ATI certified with 6 or 8 pin PCI-E power cable options, the new Tagan 2 Force II Series are available from 400 watt to 900 watts and boasts 12v rail configuration often found in more top end PSUs. The Tagan 2 Force II series operates under the Tagan Silence Control Technology so you wouldn't even know it was there!

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HARDCORE

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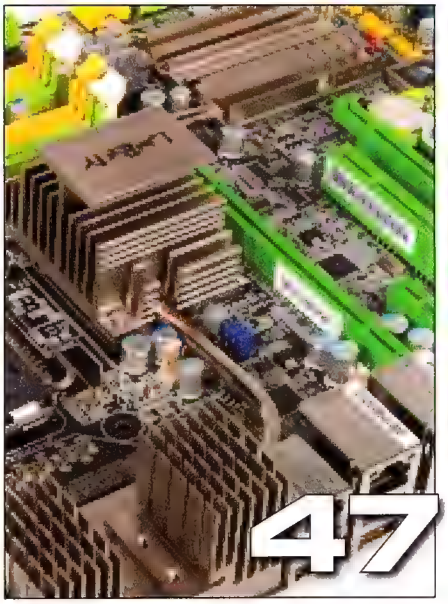
NEWS, REVIEWS AND ROUNDUPS ON THE LATEST HARDWARE

The DFI LANPARTY makes a triumphant return! Oh how we've missed the lurid flouro slots. But can it resurrect the legendary performance reputation that made us love DFI in the old days? We've also got the first X38 mobo in for testing. Gigabyte's GA-X38-DQ6 promises to be an overclocker's dream.

Having all these hardware lovelies is all pretty pointless, unless you use it all to beat the living crap out of the very latest games. That, friends, is the main Hardcore feature this month. Logan's crafted the definitive piece on the new 3D engines, it's a tasty look deep inside the world of coding wizards and the magic they make.



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5 Altec Lansing iM510 Sansa speakers to win!

www.atomicmpc.com.au/competitions

We like the non-Apple coolness of the Sansa portable music player. The thing needs a good set of external speakers for true happiness though, and the Altec Lansing inMotion iM510 is a great box for travelers, bedrooms, by the pool or kitchens. Anywhere really! It's little, but it's loud.

Disty Audion has given us 5 to give to you, worth $199 each. Sweet. Hit the Atomic site comps section to enter!

BENCHMARK

How we test,
what we test,
when we test it

3DMark05 and 06 are the legs of our bench. As freely downloadable tools, they allow people all around the world to compete on a single platform, regardless of its indication of real world application, and its ability to keep our table stable.

On the gaming surface, Call of Duty 2 takes first honours in the FPS department. Quake 4 follows closely behind for our OpenGL benchmarks, taking over from where the venerable Doom 3 left off and offering multiple CPU optimisations. Half-Life 2 remains, its market penetration simply too huge to ignore. X3: Reunion makes an appearance, in an effort to have a benchmark that is not an FPS. In the same line, Splinter Cell: Chaos Theory has also been added. Other games do exist. Honest.

All tests are run at 1280 x 1024, 1600 x 1200 and 1920 x 1200 with vsync off, to cater for the most popular LCD resolution, CRT resolution and those who own widescreen monsters respectively.

To hit the CPU, we use LAME MT, a multithreaded version of the popular MP3 encoder, which is used to compress a standard 30-minute WAV file. Similarly, VirtualDubMod is used to compress a standard 1GB raw video file into XviD at 1300Kb/s. Other CPU specific tests in our stable are Maxon's CineBench and SuperPi Mod. Rounding out the suite, SiSoftware's Sandra tests several subsystems across the board, while HDTach and ATTO Disk Benchmark helpfully provide hard drive scores.

All these tests are run on a Windows XP SP2 platform, running the latest official drivers available. Every test is run three times to eliminate any oddities that may crop up along the way, the final result printed in the magazine being an average of those scores.

Of course, all this is pointless without a standard set of hardware, and as such it is laid out below for the world to see. On with the testing!

The *Atomic* Hot Award is given only to the best. In our roundups, we differentiate the best further using the following awards:

VALUE AWARD This means the product is the best buy price-wise.

PERFORMANCE AWARD Price isn't a big factor – it just has to make our benchmarks burn and our eyes water.

EXTREME AWARD Forget everything. If it's *mind-blowingly amazing*, then it'll get an Extreme Award.

BENCHMARKS

Graphics

3DMark05
Game tests only, 4xAA, 8xAF
www.futuremark.com

3DMark06
Game tests only, 4xAA, 8xAF (SM2.0), 8xAF (HDR/SM3.0)
www.futuremark.com

Half-Life 2
Canals custom timedemo, 4xAA, 8xAF, all details highest, HDR off
www.half-life2.com

Splinter Cell: Chaos Theory
Lighthouse Demo, Shader Model 3.0, 8xAF, shadow resolution high, all features on
www.splintercell3.com

X3 Rolling Demo
High settings, auto quality control disabled, glow enabled, 4xAA, 8xAF
www.egosoft.com/games/x3/info_en.php

Call of Duty 2
Hill 40 – Defend custom timedemo, 4xAA, 8xAF, all options highest
www.callofduty2.com

Quake 4
High quality, 4xAA, 8xAF, Multiple CPU support, all options highest
www.quake4game.com

Subsystems

HDTach
www.simplisoftware.com

LAME MT
softlab.technion.ac.il/project/LAME/html/lame.html

VirtualDubMod
virtualdubmod.sf.net

SuperPi Mod
www.xtremesystems.com/pi

Cinebench
www.cinebench.com

SiSoft Sandra
www.sisoftware.co.uk

Everest
www.lavalys.com

Others

DisplayMate
www.displaymate.com

ATI Tool **www.techpowerup.com/atitool**

RivaTuner
www.guru3d.com/rivatuner

FRAPS
www.fraps.com

CPU-Z **www.cpuid.com**

Stress Prime 2004 Orthos
sp2004.fre3.com

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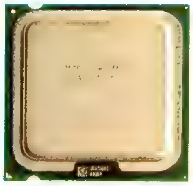
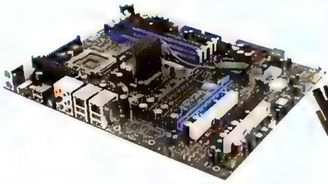
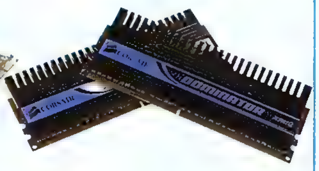
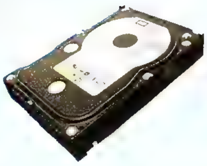
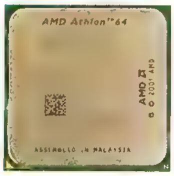

▲ Intel Core 2 Duo X6800

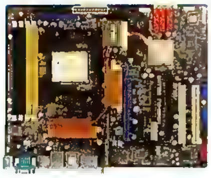

▲ EVGA 680i SLI

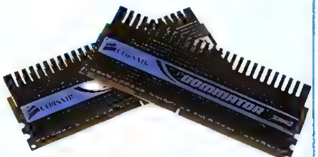

▲ 2GB Corsair Dominator PC2-10000


▲ WD 1500ADFD

▲ Enermax Galaxy 1000W


▲ AMD Athlon 64 FX-62


▲ ASUS M2N32-SLI Deluxe


▲ 2GB Corsair Dominator PC2-10000

▲ Dell 2405FPW

▲ ASUS 8800 GTX

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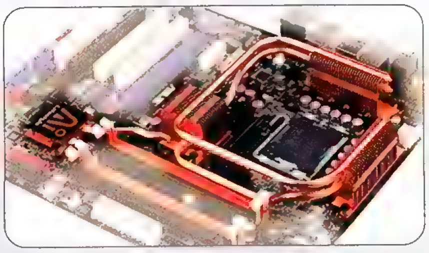
Fast and Cool. That's how I would describe the new ASUS P5K3 Deluxe Motherboard. With advances in innovative computer technologies, ASUS seems ready to herald in a new evolution in motherboard hardware standards. With inherent support for the Inte® P35 Express Chipset, a FSB of up to 1333, Super Memspeed Technology, a new generation 8-phase power design and much more, this series of motherboards looks set to transcend new levels of motherboard performance.

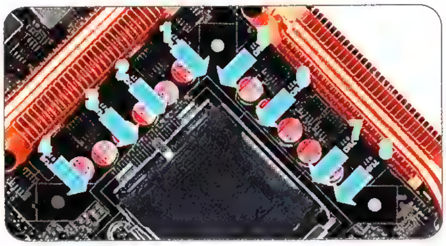
Boost Memory Speeds up to 90.6%

The first thing that made me do a double take was ASUS's Super Memspeed Technology. This cutting-edge feature provides precise overclocking options by calculating the most accurate FSB/DRAM frequency proportions without wasting any performance; while enhancing overclocking capabilities at the same time - boosting memory speeds by up to 90.6%.

15˚C Cooler with Innovative 8-Phase Power Design

ASUS's solution in addressing the issue of PC heat generation is twofold - with the new generation 8-Phase Power and



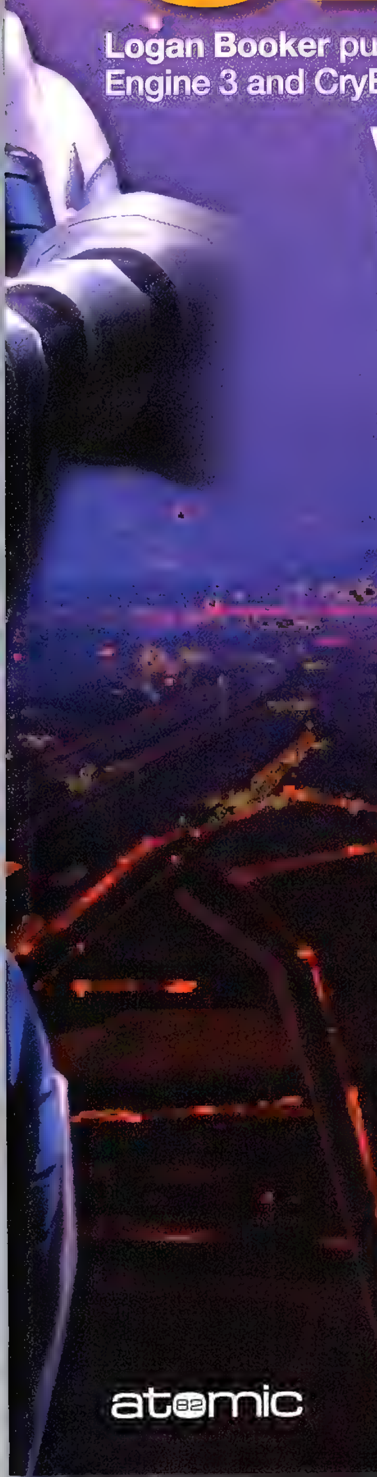


Pure Copper Design Heat Pipe giving you cooler and quieter operations. The new generation 8-Phase Power Design provides highly efficient operations with less heat (at least 15˚C (59˚F)) than other conventional 4-phase power designs. Additionally, The P5K3 Deluxe comes with a Pure Copper Heat Pipe design that makes it even more effective in directing the heat generated by chipsets to the heat sink near the back I/O ports.

Advertisement

ENGINES OF CREATION

Logan Booker puts the top three game engines of the next-generation – Source, Unreal Engine 3 and CryENGINE2 - against each other. Let the battle of pretty pixels begin.



You can argue all you want that gameplay supplants graphics in the priorities of game design, but with fairly competent 3D accelerators in almost every modern PC, combined with the growing penetration of fast, dual-core CPUs, not to mention the proliferation of powerful game consoles like the Xbox 360 and PlayStation 3, it has become expected that games will not only look good, but play good.

So important are visuals in today's games, that one's impression of a title can be influenced heavily by a glistening screenshot that seems to defy reality by being, well, too real.

Crytek's *Crysis* is probably the best example of a game that could potentially be utterly woeful, but thanks to graphics so detailed and perfectly lush, we're all giddy with excitement at the prospect of playing it, even though no one has yet to actually play it.

Promises of completely destructible terrain, bending foliage, totally dynamic lighting and, the cherry on this polygon-shaped cake, Direct3D 10 support, has the gaming media at large hypnotised.

It's odd, then, that other than two low-key developers, no one has gone out of their way to license CryENGINE2, the beating heart of Crytek's soon to be released opus. Could it be that there's more to a game engine than just graphics? Of course there is.

This is just one reason why *Atomic* decided to take a look at the game engines that will be the most prominent in the years to come, technology with the potential to be used in games other than those they were originally developed for. It was a hard choice to focus on just a few, but we finally nailed down the three we believe to not only be the best, but have the highest chance of finding their way into the work of other developers. Those engines were Epic's Unreal Engine 3, Valve's Source and, of course, Crytek's CryENGINE2.

UNREAL ENGINE 3

Engine developer **Epic** Summary **Sweet and safe**
First game **RoboBlitz** Released **November 2006**
Platform **PC/Xbox 360**

First, there was *Quake*. Then, there was *Unreal*. The former was licensed out so much in the early nineties, id Software might as well have stuck a copy of the engine, a bunch of blank discs, a burner and cash deposit box outside its headquarters in Dallas, Texas and just let the likes of Raven go crazy.

Unreal, on the other hand, took its time gaining traction, but once it did, it quickly surpassed the popularity of its rival and today is easily the most licensed game engine in existence, with over 100 titles based on some form of it.

That latest incarnation of the technology is Unreal Engine 3. Although its potency was demonstrated back in 2004, it wasn't until late 2006 we'd see the first use of the engine, in a game called RoboBlitz.

RoboBlitz did an okay job of showing off the new technology. The most advanced bells, whistles, trumpets and clarinets of Direct3D 9.0c were on display, including high-dynamic range lighting, virtual displacement maps, the very latest in normal mapping, bloom, specular maps, soft shadows, volumetric fog and post-processing. It was like id's *Doom 3*, but on steroids. Lots of steroids.

Even then, for most gamers poor RoboBlitz was just a blip on the radar. For us, it was 2K Australia/2K Boston's *BioShock* that appeared like a leviathan on our scope, shaking its gorgeousness around like Jessica Alba in *Honey*. And honey it was, when it finally appeared in August '07.

'[UE3] was a pretty natural decision for us as we've already worked extensively with *Unreal* on previous projects,' explains Jonathan Chey of 2K Australia/2K Boston. 'Epic had already indicated that they would be making a big push to get the engine performing well on 360 as well as PC, and it was important to us to find an engine that performed well on console in addition to PC.' Thanks to this familiarity and the maturity of the technology, Chey says that prototyping BioShock was easy from the word go.

UE3 was not perfect, however.

'With any engine there are always certain choices that the tech provider makes that aren't those you would have made yourselves. For example, we're not big fans of the content package system in *Unreal*,' says Chey. 'We have a lot of problems with multiple developers trying to access elements in a package at the same time, which results in workflow problems. Also, having to share data from [one] side of the world to another, as we do, isn't well supported when you have very large monolithic data packages.

'But using any engine is about learning to live with

the decisions that have been made and not trying to fight against them,' he says.

Other than the data file gripes, the 2K studio has little in the way of bad things to say about the engine. In fact, 2K Australia/2K Boston is looking forward to the PS3 version of UE3 - the reason for which we'll leave as an exercise for the reader.

Recently, two game developers – US-based Silicon Knights and the Japanese Mistwalker Studios – have drawn issue with UE3, specifically Epic's ability to provide support.

Chey admits that 2K Australia/2K Boston's familiarity with the *Unreal* technology means that they've had little reason to phone home. For newcomers SK and Mistwalker, it's a different story.

According to tech site Arstechnica, Epic provided SK with a version of the engine that did not perform as advertised. Arstechnica quotes SK president Dennis Dyack, who claims that Epic failed to rectify the problems the company presented. As such, it has now entered into litigation with Epic.

For Mistwalker, Arstechnica discovered that although Epic provides free updates to its technology, it was not so keen to help the studio integrate the new tech into its current project. Mistwalker also had trouble communicating with Epic, due to a lack of Japanese-speaking staff.

While some of the issues are obviously not Epic's fault, it does bring into question exactly how supportive the company is of its technology.

STRENGTHS Maturity and a strong legacy. With studios as diverse as Bioware making the RPG *Mass Effect*, to Auran's work on the fast-paced third-person MMO *Fury*, UE3 can do it all. It also helps that the technology supports D3D 9.0c and D3D 10 (as shown in *BioShock*), and looks utterly superb when used to full effect. We also know that *Unreal* provides licensees with new updates for its technology, so they're never behind the curve.

WEAKNESSES According to Jon Chey, the data file system is not the most flexible out there. There's also the question of UE3's ability to render large outdoor scenes, something which we have yet to see in the currently available titles that use the technology. Finally, the issues with Silicon Knights and Mistwalker has us wondering if Epic is spread to thin, or has become lax with its licensee support. It's not an issue many developers will talk openly about, but we'll be watching events unfold with upcoming UE3-based properties including *Fury*, *Mass Effect* and *Jericho*.

SOURCE

Engine developer **Valve** Summary **Old reliable**
First game **Counter-Strike: Source**
Release date **October 2004** Platform **PC**

Three years is a long time in the games industry – even longer for an engine. Yet, here we are in 2007, and Valve continues to fight the good fight with Source.

Yes, the technology could be considered a relic if you were to place it against the fast pace of graphics accelerators. Considering this, Source might as well be an M1 Garand compared to the sophisticated mechanics of Epic's F88 Austeyr-like UE3.

Of course, when Valve licensed the *Quake*-based *Quake 2* engine from id, it made numerous upgrades including skeletal animation and 32-bit colour, for *GoldSrc*, which eventually became *Half-Life*. *Half-Life* was again vamped with Havok physics, shader support and advanced facial animation, which gave us Source and *Half-Life 2*. *Half-Life 2: Episode One* brought normal maps and high-dynamic range lighting and, according to Valve, *Half-Life 2: Episode Two* will deliver multi-threading, dynamic lighting, full-motion blur and a soft particle engine. It is testament to Source's modularity that, despite its age, it's managed to keep up with the best from Epic, and even Crytek.

One upcoming title that will use the latest Source is *Dark Messiah of Might & Magic: Elements*, an Xbox 360-only game being developed by Ubisoft Annecy. Coming from the Unreal Engine - having worked on *Splinter Cell* - the Annecy team found Source's flexibility both a blessing and a curse.

'Compared to *Unreal*, it is definitely a very permissive and very powerful engine that enables you to prototype very quickly,' producer Daniel Palix explains. 'This permissiveness has some drawbacks, however, as you can generate tricky bugs as well.'

The Xbox 360 is a new frontier for Source, which has been most dominate on PC. This fact has not phased Annecy however.

'[The] Xbox 360 is definitely a viable platform for Source,' he says. 'We managed to compress all the data to fit in memory. With the help of Valve, we managed to optimise the engine, include multi-core and reach a good frame rate.'

Palix admits that achieving this result took more time than the team anticipated. He also revealed that the version of Source provided by Valve did not include the dynamic lighting that will be present in *HL2: E2*, and Annecy had to add in its own implementation.

By coincidence, the now-defunct Troika also had to make do with a less-capable version of Source – specifically its lack of dynamic lighting. With its FPS/RPG *Vampire: The Masquerade – Bloodlines*, Troika not only went to the effort of writing its own lighting code, but added a better particle system and cloth simulation, according to our interview with former CEO Leonard Boyarsky back in *issue 48*. At the time of the interview however - and to be expected - we didn't get the entire story.

In a 2006 interview with online mag *The Escapist* on the downfall of Troika (**www.escapistmagazine.com/articles/view/issues/issue_77/440-The-Rise-and-Fall-of-Troika.3**), Boyarksy revealed that the developer had to work with a prototype version of Source that lacked AI code, forcing the developer to make its own from scratch.

STRENGTHS Modularity in spades. What Source may lack in visual power, it makes up for by being extremely flexible to the demands of the developer.

Source also sports an OpenGL renderer, an option sorely lacking in almost every other commercial engine available, and makes the potential for porting to the Direct3D-less PS3 less of a hassle.

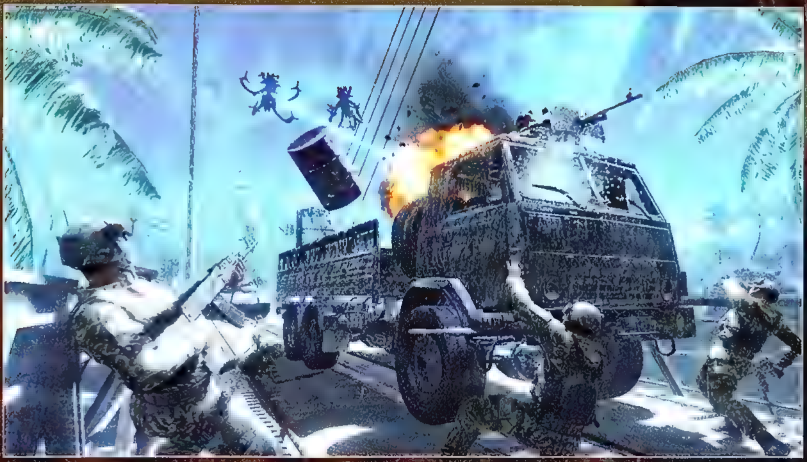
In addition, having been built with Direct3D 6 as the baseline, the engine can potentially scale as far back as the original GeForce, if not further.

And who could forget that facial animation. Source's implementation has yet to be bettered, and it was one of the big selling points for Troika with *Bloodlines*.

WEAKNESSES: Most of Source's weaknesses stem from its strengths. Backwards compatibility somewhat limits how crazy Valve can go embracing the top-end. Keeping both a D3D and OGL renderer up to scratch is likely a burden as well.

Finally, even with OGL support lurking in the background, Source has yet to venture onto platforms other than the PC, with *Elements* the first title to do so. And it's hard to sell yourself as the cutting edge when you're using the same BSP format for maps that id used in Quake.

In fact, it's possible to load maps from Half-Life into the original Quake, without modification.



CRYENGINE2

Engine developer **Crytek** Summary **Up and coming**
First game **Crysis** Release date **November 2007**
Platform: **PC/Xbox 360**

According to Leonardo da Vinci, it is through the eye that we enjoy the beauty of the world. Taken as fact, it would go some way in explaining why, despite the hard work of Valve and Epic, it is Crytek's CryENGINE2 that continues to impress on levels far and above those of its competitors.

Put simply, the damn thing looks super fine, every time.

CryENGINE2 is the sequel tech to Crytek's CryENGINE. CryENGINE started out as a glorified demo for

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NVIDIA's GeForce3, to present the power of programmable pixel and vertex shader units. Although not commissioned by Microsoft, CryENGINE2 will, in a similar way, promote the power of Direct3D 10.

It is this fact that has propelled CryENGINE2 into the spotlight time and again, and it is because of this we wait, sometimes painfully, for the arrival of Crytek's second game, *Crysis*, which is based on this voluptuous technology.

What's not to like? Along with the now-industry standard support for normal maps and dynamic lighting, CryENGINE2 boasts realistic ocean rendering, sub-surface scattering, advanced physics to accommodate bending rope and vegetation, fully destructible environments and view distances of up to 16km. *Crysis* will finally put an end to the debate that first-person shooters must spend most of their time inside, a debate that Crytek's first game, *Far Cry*, provided the opening arguments for.

However, even packing this killer set of features, CryENGINE2 has yet to be widely licensed. It's been picked up by Korean developer XLGames for its upcoming nameless MMO and, somewhat more notably, by MindArk to upgrade the look of its MMO Entropia Universe, but otherwise the demand for Crytek's engine is reserved.

Perhaps with the release of *Crysis*, we will see a flood of developers scrambling for the technology, but for now, the dependability and support provided by Valve and Epic continues to see CryENGINE2 fight for attention.

STRENGTHS Eye candy. Lots of scrumptious, sugary chunks of eye candy, designed to not simply impress, but to blow minds. The first engine to truly harness the benefits of Direct3D 10, any game designed with CryENGINE2 as its foundation will look utterly stunning, no matter the environment. Crytek has shown the engine to be capable of rendering large, realistic-looking outdoor areas as well as corridors so tight they put *Doom 3* to shame.

WEAKNESSES CryENGINE2's biggest weakness is that it is an untested technology in an industry with at least two engines that have meet the demands of several licensees. With no track record to show to prospective clients, Crytek will have to rely on the visual strengths of its technology, and the success of *Crysis* when it is released.

It is also unclear as to how much of the engine's graphical prowess is dependent on Direct3D 10, and whether it has sufficient backwards compatibility to look half as decent on older versions of Microsoft's 3D API.

Finally, judging by Crytek's current attempts to hire a PS3 programmer with experience in cross-platform development, whose responsibilities will include 'development of a next-generation game framework based on CryENGINE2', there's proof enough that the engine, for the time being, is PC/Xbox 360 only.

COMPARISON OF ENGINE FEATURES

Engines	Unreal Engine 3	Source	CryENGINE 2
General			
Multi-threaded	Yes	Yes	Yes
DirectX	No		
Support for DirectX 7/8.1	Yes	Yes	No
Support for DirectX 9.0c	Yes	Yes	Yes
Support for DirectX 10	Yes	Yes	Yes
Lighting and shadows			
Softshadows	Yes	No	Yes
Dynamic lighting	Yes	Yes	Yes
Volumetric lighting	Yes	No	Yes
Subsurface scattering	Yes	No	Yes
High dynamic range	Yes	Yes	Yes
Post-processing			
Motion blur	Yes	Yes	Yes
Depth of field	Yes	No	Yes
Bloom	Yes	Yes	Yes
Textures			
Parallel/virtual displacement maps	Yes	No	Yes
Deformation maps (terrain)	Yes	No	Yes
Physics			
PhysX processor support	Yes	No	No
HavokFX support	No	No	No
Scripting			
Proprietary or open language	Proprietary (UnrealScript)	None (hard-coded)	Open (Lua)
Included IDE	Yes	No	Yes
Included debugging tools	Yes	No	Yes
Intergrated platform support			
PC	Yes	Yes	Yes
Xbox 360	Yes	No	Yes
ps3	No	No	No
Wii	No	No	No

WHAT ABOUT...?

We'll be the first to admit that there are a lot of new engines on the horizon, destined to power some great-looking games.

id Tech 5 for one is something we should keep watch of, if only because it's coming from id. DiCE, of *Battlefield* fame is working on *Frostbite*, which will breathe life into its next multiplayer shooter. The Offset Engine from Offset is a personal favourite, with Australian developer Rod Green orchestrating a great deal on that sexy piece of tech. Then there's Monolith with its Jupiter Ex, the latest revision to appear in *Condemned 2*.

Sadly, we had to focus on those projects with the highest chance of being licensed in the near future, and ultimately, that's how we made the decision to look at the engines we did. We think you'll agree that, considering this requirement, the final three were very apt.

CONCLUSION

Unreal Engine 3, by its sheer popularity, comes out on top in our comparison. As luscious as CryENGINE2 is, it just doesn't have the developer support behind it that Epic's work does. Source, even with its continual updates, is looking dated these days, and while the likes of Troika, Arkane Studios and Ubisoft are behind it, Source can't match the 100+ games Unreal Engine currently resides in.

We're interested to hear more about the troubles Silicon Knights and Mistwalker have had with Epic, but it's unlikely we will get any juicy details in the next six months.

So, congratulations to Epic - at least for now.

ENGINE RETROSPECTIVE WITH KEN SILVERMAN

What in heaven's name did we do when vertex and pixel shaders were just buzzwords thrown about by NVIDIA marketers with the launch of the GeForce3?

We still had CPUs, of course. Before massively parallel processing became a force in the gaming world, programmers had to be creative. And smart. And multi-talented.

One such man who possessed these abilities and showed the world that there was more to the first-person shooter genre than whatever id could produce, was Ken Silverman.

Although he's been out of the industry for some time, he's more than able to talk about game engine development back in the early nineties.

'We had to optimise everything - there wasn't much room for being sloppy,' says Silverman on working at 3D Realms on Build - the engine that would eventually make *Duke Nukem 3D* reality.

According to Silverman, so important were CPU cycles that monsters in *Duke3D* would have to take turns checking for the player. 'When a monster fell out of a player's sight, it would quickly be moved to the inactive list to avoid unnecessary calculations,' he says. Silverman believes that the delay incurred by doing this however added to the realism.

Compiler tricks were also all the rage back in the day, where Silverman says that simply saving one instruction in a register in 16-bit mode could make all the difference between 40 and 50fps. For *Duke3D*, he had to learn the ropes again for 32-bit compilers, but eventually he built up enough shortcuts to make the transition worthwhile.

Features in modern engines that we take for granted, such as room-over-room and the ability to look up and down, had to be implemented as hacks in tech such as *Duke3D*. It was more about distorting the player's vision than having the engine smoothly provide the correct perspective.

Finally, Silverman is a big fan of voxels. Voxels are essentially pixel blocks. Instead of building an object of flat polygons, as is the standard today, an engine would construct it from hundreds, even thousands, of coloured cubes.

'Have you ever wondered why all modern games tend to look the same?,' says Silverman. 'One reason, I think, is because specialty hardware tends to hinder creativity.'

However, Silverman scoffs at the idea of a 'voxel' accelerator, saying that the current philosophies of CPU design would be enough to provide for a voxel-based engine.

'All it takes is a polygon engine with unlimited dynamic terrain to make a voxel accelerator look ridiculous … [For voxels] I would be most interested in a general purpose CPU with many cores. Parallel processing is where the future lies,' he says.

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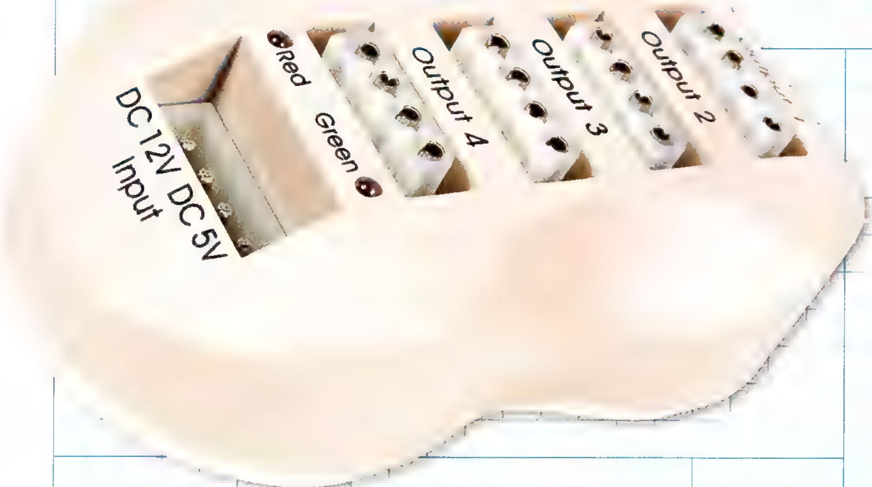
Price $24.99 **Supplier** Boobmats
Website www.boobmats.com.au

Unlike traditional mouse wrist-rests, the boobmat twin-peak design snuggly and naturally provides comfortable lateral support. The integrated boobs + mousing surface ensures any movement on your desk doesn't misalign where you expect your wrist to fall. The breasts are soft yet luxuriously supportive.The mouse surface itself is a wonderfully smooth yet responsive delight. There are seven girls to choose from including one with a bottom instead of boobies. We were expecting this to be gimmicky rubbish, but in fact they are extremely good. Plus, they gots boobs. Boobs!



Sunbeam Mini Bay Bus

Price $8 **Supplier** PC Case Gear
Website www.pccasegear.com

This rather interesting and colourful device is designed as a 4-pin 'male' power connector HUB. Once a 4-pin connection from the PSU is plugged into the 4-pin input connection, this supply of power is then fed to the four output ports. To assure a clean and consistent power supply, the input connection has two monitoring LEDs. One a green LED, denoting the activity or lack there of, on the 5v connection and the second a red LED, again denoting the necessary info, this time in regards to the 12v supply. A cool idea for those looking to extend their 4-pin power connections and with an added bit of bling!

Hades Gaming H1 mouse

Price $65 **Supplier** Scorpion Technology
Website www.scorptec.com.au

Rated for a selectable range 100 DPI to 3,200 DPI, also featuring two side thumb buttons, Teflon mouse feet, DPI LED indicator lights and a red LED lit mouse wheel, this little rodent weighs in at 128 grams.Staying in the weight category but a little more localized, in the bottom rear of the mouse you can add or subtract up to 5 x 5 gram weights to assure that perfect mousing-about weight for your tailed friend. Also apart of the package is a set of eight extra Teflon mouse feet and a carry pouch for those of you that like to take your mouse on the road. Features similar to a Logitech gaming mouse with a slightly cheaper feel but for half the price, the Hades H1 is a budget bonus round winner.

Sunbeam LED Case Feet

Price $16.50 **Supplier** PC Case Gear **Website** www.pccasegear.com

Doof doof doof! That was our first thought when these case feet were turned on, as they flickered away in a strobe lighting setting.

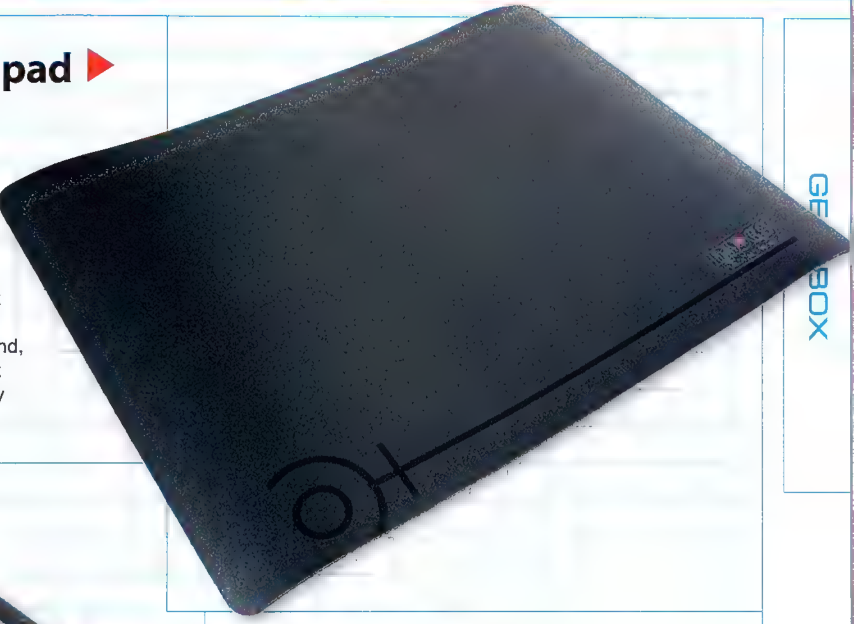
After our epileptic fit, we sat content as the green button on rear PCI bracket allowed us to change between different settings. These settings include a constantly on setting, the aforementioned strobe setting and a fade in/fade out setting for a more subtle approach. Easy to install and effective in their purpose, it's just a matter of deciding whether you want to have your PC appearing on four clear cylinders filled of blue light.

Hades Gaming Styx G1 mouse pad

Price $49 **Supplier** Scorpion Technology
Website www.scorptec.com.au

Measuring a decent 350mm x 260mm x 3mm and with silver coloured medium-rough top surface with a soft slip-proof bottom, this pad clearly set to be a distinction among the rest.We questioned though whether it could compete with the rest, as it felt as if the mouse was slipping across the pad, not gliding. This was tested using the Hades Gaming H1 mouse with the other mouse pads tested on being a Steel Qck Heavy mouse mat and fUnc Archetype mouse pad.

For a similar amount of money, cheaper even if you shop around, a better playground for your rodent can be obtained. With work safety such a big deal these days, we wouldn't want to see any rodents injured whilst in the line of duty.



O2 XDA Flame

Price $1195 **Supplier** O2 **Website** www.seeo2.com

A pretty penny more then the O2 XDA Atom Life Limited Edition we saw in last issue, the O2 XDA Flame is also based on an Intel XScale PPXA 270 based processor. The O2 XDA Flame features 128MB of memory, an additional 2GB storage and an NVIDIA Go-Force 5500 based graphics processing unit. The XDA Flame also sports a 2 mega pixel camera with 4x digital zoom for capturing a photo of your obviously gorgeous lady friend – or friends if you're Casanova. To display the power within this smart phone, it uses a 3.6" VGA TFT touch panel LCD capable of 480 by 640 resolution and displaying 262k colours.

Belkin High-Speed Docking Station

Price $294 **Supplier** Belkin **Website** www.belkin.com.au

Totally removed from the conventional system of plugging in a plethora of cables, plugs, peripherals and general mess that make the holes of your laptop more filled then a 2-dollar hooker, this nifty little product allows for a single and simple connection to provide multimedia functionality.

Using the ExpressCard slot, this docking system allows for a single connection to the laptop to feed out into a bay providing a list of connection features such as VGA, DVI, Ethernet, USB, coaxial and optical sound output and coaxial sound input. For simple on the fly docking, this unit ticks the boxes.

USB Panic Button

Price $24.95 **Supplier** PC Case Gear
Website www.pccasegear.com

The potential of this little gadget is phenomenal. Designed as a fancy boss-key, the Panic Button comes with an extremely easy to setup macro that full-screens any image you choose. Of course, leet haxxorz could create a macro to do any number of imaginative and tremendous things and the less code inclined can still use the device as a system lock. The only downside being a one second lag between pressing of the button and the image appearing, but we can overlook that short coming. This is, quite simply, awesome.

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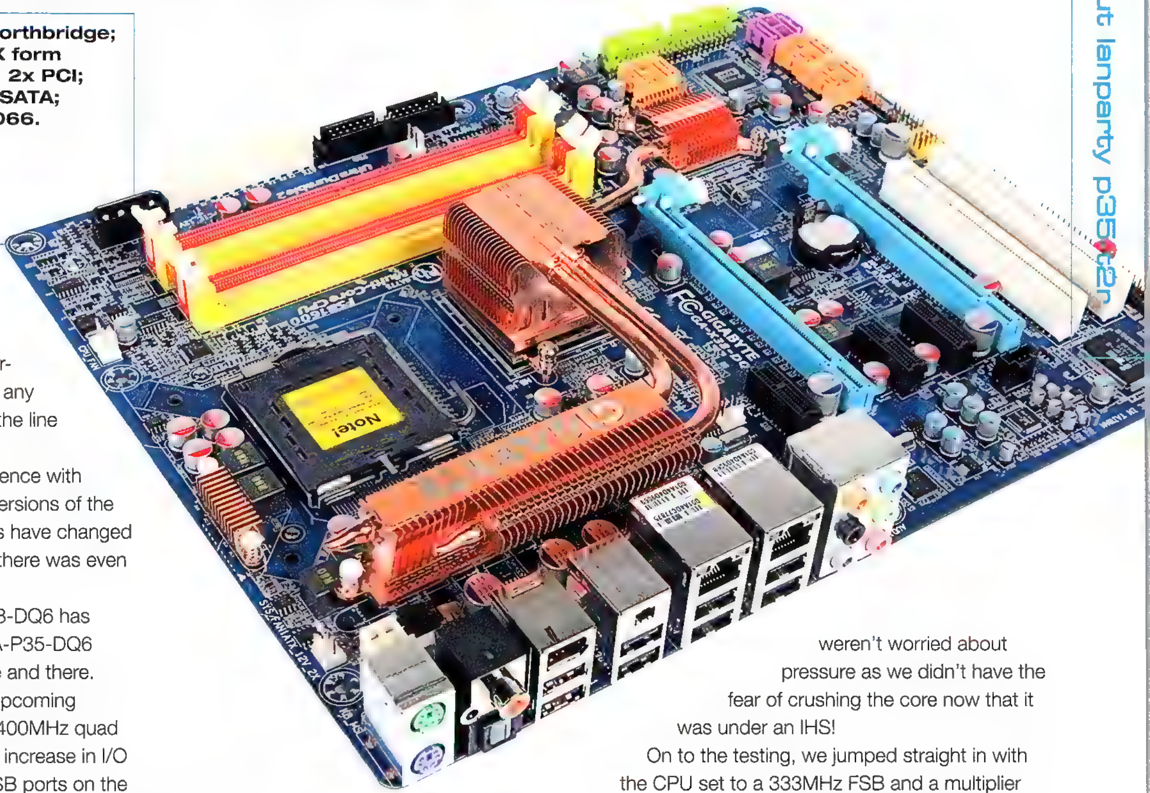
Gigabyte GA-X38-DQ6

Josh Collins goes in search of the X-factor in the big G's latest DQ6

SPECIFICATIONS
Socket 775; Intel X38 northbridge; ICH9R southbridge; ATX form factor; 2x PCIe 2.0 x16; 2x PCI; 3x PCIe x1; 1x EIDE; 6x SATA; 1600MHz FSB; DDR2-1066.
price **TBA**
supplier **GIGABYTE**
website **www.gigabyte.com.tw**



X38 has been a highly anticipated release and GIGABYTE has been one of the first to market with a product featuring this new northbridge. This isn't any old product though; it's the top of the line model with the DQ6 insignia.

After having an enjoyable experience with the P35 based DDR2 and DDR3 versions of the DQ6, it was time to see how things have changed with the new chipset – or if in fact there was even any noticeable change.

On the spec sheets, the GA-X38-DQ6 has much the same features as the GA-P35-DQ6 with the addition of some frills here and there. New features include support for upcoming 45nm processors on a 1600FSB (400MHz quad pumped), PCI-E 2.0 and a general increase in I/O ports, for example the available USB ports on the rear I/O panel now stand at a total of 10.

Another noticeable change is the increase in the power regulation around the socket, with the X38 version again upping the capacity with the 'Quad-Triple' phase power regulation, whilst continuing the complete use of solid state capacitors. This assures consistent and accurate power supply to your dual core and/or quad core processors thus minimising the amount of vdroop and vcore loss (drop).

The legend of *Atomic's* Craig Simms lives on within this board, with one of his most voiced concerns of previous DQ6 models finally being addressed, and directly attributed to his pleas. This issue is the placement of a large portion of the SATA ports that, when utilising a dual card graphics solution, can potentially all be blocked by cards such as the HD2900XT. To correct this issue, GIGABYTE shifted these SATA connections down towards the bottom right of the motherboard.

On the flip side, something that hasn't seen any attention is the placement of the CMOS clear jumper – it's still a royal pain to get to.

For those of you that will go endeavouring on a journey into third party cooling on the northbridge will find the chipset now has an IHS just like a CPU does. This brings with it both positives and negatives. A positive being the heat dissipation from the northbridge core can be evenly dispersed to a greater surface area prior to being transferred into a cooler. The negative is that some current cooling systems, particularly those relying on a push-pin retention mechanism will find it difficult, perhaps even impossible in some cases, to properly secure the cooling solution.

To test this, we used a Noctua NC-U6 chipset cooler. Due to the slight increase in height from the IHS, as expected, the push pins were quite difficult to get firmly set in place. Amusingly, we weren't worried about pressure as we didn't have the fear of crushing the core now that it was under an IHS!

On to the testing, we jumped straight in with the CPU set to a 333MHz FSB and a multiplier of nine. To round things off, the memory was set on a 2:3 divider to run at DDR2-1000 with alpha timings of 4-4-4-10.

As can be seen in the table, the system scored is what would be expected with a healthy 11.2k 3DMark06 result. This was interesting as one of the features that differentiate the X38 chipset from the P35 chipset is the introduction of the PCI-E 2.0 standard, however little gain was noticed. With that noted, we do expect the up coming NVIDIA G92/G90 cores to take full advantage of the increased bandwidth, as do we also expect a slight increase on the HD2900XT from AMD ATI.

Moving onwards to the real overclocking, we jumped straight to a 500MHz FSB as not only did we believe this to be the standard of any decent motherboard, but also that it shouldn't be too much to ask of Intel and GIGABYTE's new top dog.

The system booted happily at 500MHz with a multiplier of six. Paired with this was the memory set on a 1:1 divider, alpha timings of 4-4-4-10 and an end frequency of DDR2-1000.

In the end, GIGABYTE has continued on from the strong impressions left by their P35 series and the X38 offers a strong and reliable basis for a solid enthusiast spec system.

	333x9; DDR2-1000 4-4-4-10	500x6; DDR2-1000 4-4-4-10	550x6; DDR2-1100 4-4-4-10
3DMark06	11218	11244	11600
Super Pi 4M	1m 33.172s	1m 31.000s	1m 20.313s
wPrime 32M	29.171s	29.109s	25.578s
Everest read	7452MB/s	8553MB/s	10157MB/s
Everest write	6082MB/s	7970MB/s	8920MB/s
Everest latency	77.2ns	102.1ns	82.3ns

SCORE
8.5
OUT OF 10

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The Thermaltake SwordM full-tower PC case is a true reflection of the contrast between technological advances and the artistic quality of superior craftsmanship.

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The SwordM also features hydraulic mechanisms on the top and side panels for easy installation as well as a tool-free design.

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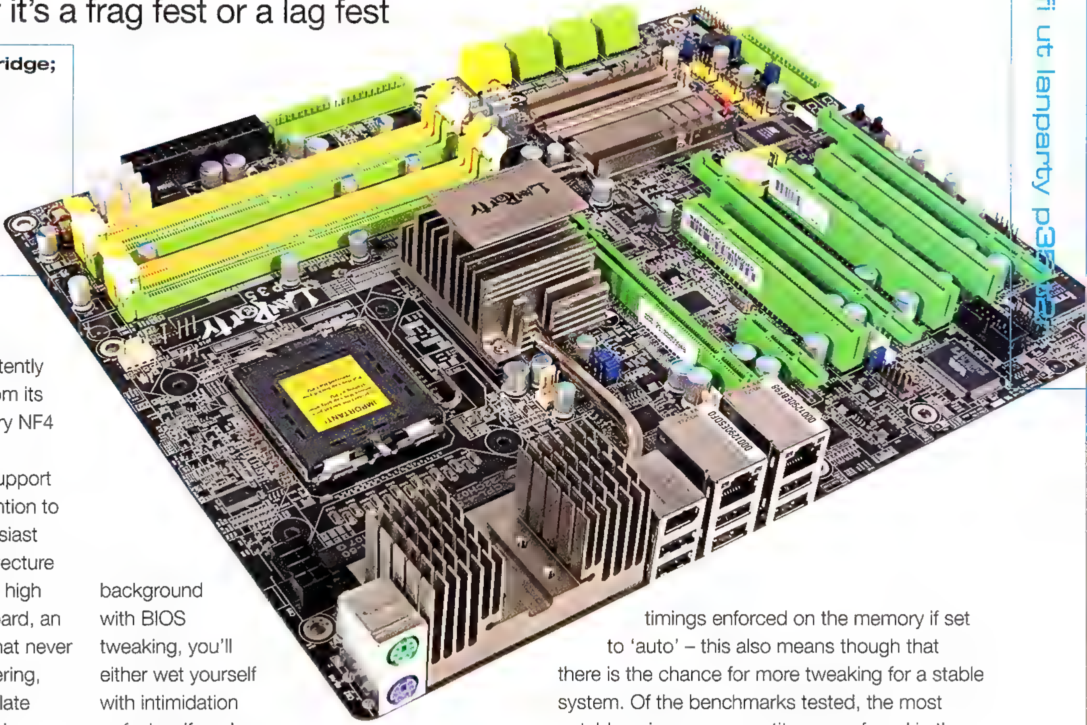
DFI UT LANPARTY P35-T2R

Josh Collins finds out if it's a frag fest or a lag fest

SPECIFICATIONS

Socket 775; Intel P35 northbridge; ICH9R southbridge; ATX form factor; 3x PCIe x16; 3x PCI; 1x PCIe x1; 1x EIDE; 8x SATA; 1333MHz FSB; DDR2-1066.
price **$390**
supplier **Bronet**
website **www.bronet.com.au**



During the AMD Athlon64 golden era of the times gone yonder, DFI was undeniably the king of the hill, with consistently strong performance across the board. From its Micro-ATX RS482 through to the legendary NF4 based SLI-DR II Expert.

DFI invested heavily in their R&D and support of the A64 platform whilst giving little attention to Intel. Unfortunately for DFI, with the enthusiast switch to Intel when the Core micro-architecture dropped upon us, DFI appeared to be left high and dry. With a lack lustre 975X based board, an NVIDIA 590 based LANPARTY platform that never made it to market after months of engineering, design and anticipation and an extremely late to market P965 and 680i based boards, it's undeniably been a rocky ride for DFI in the enthusiast Intel sector in recent times.

With a slightly delayed release of their P35-based offering, though nothing compared to that seen with their Infinity P965 release, the LANPARTY series P35-T2R appears to be a return to former glory following on from the growth in performance and stability found in their P965 board.

Featuring stand out contrasting colours as we would come to expect from a LANPARTY series board, you'll either love it or hate it – we quite like the unique colour choice.

The layout, as many enthusiasts have come to expect from DFI, is top notch. With consideration taken for the placement of the CMOS clear jumper, two onboard switches to control power and reset, eight right-angled SATA ports and digital PWMs around the socket area giving great insulation for extreme cooling.

Booting the system and entering the BIOS, you'd be excused for needing to change your pants. Depending on your experience and background with BIOS tweaking, you'll either wet yourself with intimidation or feel as if you've experienced love at first site – perhaps even prematurely.

The P35-T2R has a very well featured BIOS with every and any discernable setting, voltage adjustment or tweak made available for your inevitable trial and error as you test for the best settings to hit the desired overclock. We found the BIOS to be a pleasure to work with and a welcome competitor to the market.

Moving onto the results obtained during testing, as has been our standard in recent months, we moved straight into testing with a 333MHz FSB and a multiplier of 9, all paired with a memory divider of 2:3, thereby ensuring the memory is running at DDR2-1000 and with manually set 4-4-4-10 alpha timings.

As can be seen in the results from the benchmarks, the DFI is very quick when set to the same settings, and compared to boards from other brands such as GIGABYTE (check out the results table on page 45 for comparison).

This can be attributed to tighter chipset latencies and tighter default/stock secondary timings enforced on the memory if set to 'auto' – this also means though that there is the chance for more tweaking for a stable system. Of the benchmarks tested, the most notable gain over competitors was found in the Super Pi 4M result.

Next we increased the system's front side bus to 500MHz and lowered the multiplier to six. Running on a 1:1 divider, the memory was effectively operating at DDR2-1000 with alpha timings of 4-4-4-10.

The results speak for themselves with the increased FSB feeding the sub-systems more aggressively.

Pushing onwards, we went in search of the maximum FSB attainable using the DFI P35-T2R.

In the end, the system topped out on a bench-stable 550MHz FSB with the memory sporting a frequency of DDR2-1100 at 4-4-4-10 latencies.

The cooling of this motherboard is also interesting, with the inclusion of an additional heatpipe and fin-array that can be screwed into place, extending from either the south bridge or the MOSFET cooling block near the rear I/O panel.

Considering DFI's recent patchy past and their inability to either bring a board to market within a reasonable time frame, or creating a board that is below the par (P965 release excluded), the P35-T2R is a marked improvement. Dare we say it is a return to DFI fame, albeit on the Intel platform?

It was a positive experience to have the DFI offering on the *atomic* labs test bench and we look forward to their X38 offering expected to be released soon.

	333x9; DDR2-1000 4-4-4-10	**500x6; DDR2-1000 4-4-4-10**	**550x6; DDR2-1100 4-4-4-10**
3DMark06	11267	11284	11587
Super Pi 4M	1m 31.219s	1m 29.828s	1m 21.875s
wPrime 32M	29.483s	29.515s	26.781s
CineBench R10: single-thread	3078	3084	3390
CineBench R10: multi-thread	5879	5914	6453

SCORE
8.0
OUT OF 10

PIONEER DREAMBOOOK D90

Pioneer DreamBooook D90

SPECS

Intel Core 2 Quad Q6700, 2GB PC2-5300 memory, NVIDIA 7950GTX Go, 17" WUXGA screen, 3x Hitachi 200GB 7,200rpm 2.5" hard disks in RAID 5, Microsoft Windows Vista Ultimate
price **$5,504**

It's important to get something out of the way from the get go, the Pioneer is excessive. There is no two ways about it.

Featuring not a mobile processor, but rather a desktop processor forced into a mobile environment, it's a freakin' 2.66GHz quad core. Perhaps someone in the engineering department didn't get the memo as to what a laptop traditionally is.

Leading on from that thought, the D90 can no longer be looked upon as a laptop; for starters your lap aches within minutes of having such a heavy beast resting there, and not to mention the warm fuzzy burning sensation. The unit weighs 10kg! On the flip side, this system is clearly a portable desktop replacement solution.

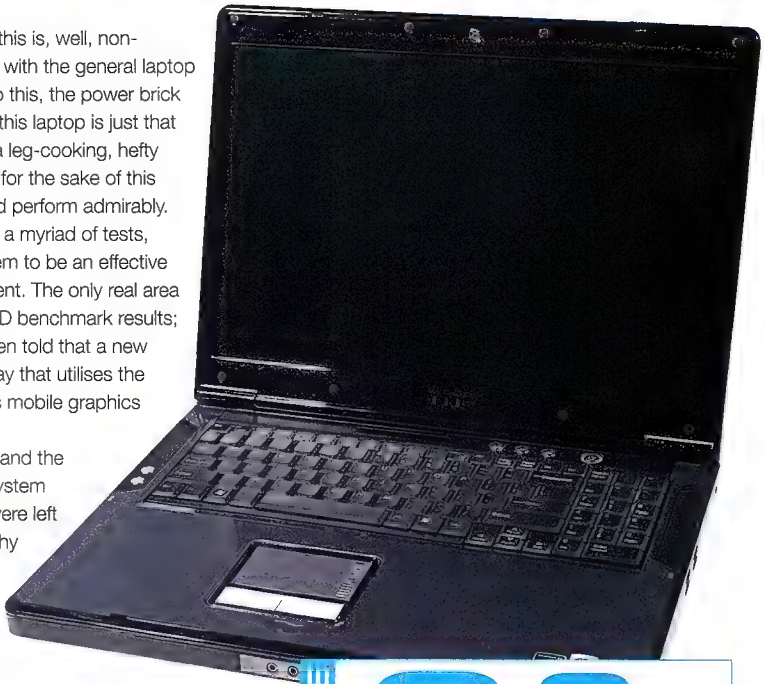
Keeping with the trend of excessive configurations, the D90 features three 200GB hard disks in a RAID 5 array, contributing a performance boost whilst assuring data redundancy – this is what we call RAID done right.

The battery life, as you could only expect from a 'laptop' such as this is, well, non-existent compared with the general laptop concept. Adding to this, the power brick that accompanies this laptop is just that – a brick. So with a leg-cooking, hefty 'laptop' we hoped for the sake of this system that it could perform admirably.

Thrown through a myriad of tests, we found the system to be an effective desktop replacement. The only real area of worry was the 3D benchmark results; however we've been told that a new revision is on its way that utilises the NVDIA 8700 series mobile graphics processor.

All testing done and the immobility of the system experienced, we were left wondering as to why we wouldn't just get a high spec Shuttle system to do the same job.

The concept of portability is both the D90's strength and weakness, in the end though for the most hardcore LAN gamers we'd suggest a Shuttle system instead.



SCORE 6.0 OUT OF 10

MATROX TRIPLEHEAD2GO

Matrox TripleHead2Go Digital Edition

SPECS

Dual link DVI input and output; maximum triple monitor resolution of 3840 x 1024 @ 60Hz; Windows 2000/XP/XP64/Vista and Mac OS X compatible; two year limited warranty
price **$549**

Matrox have been in the multi-monitor business for a while now, its Parhelia graphics card capable of powering triple monitors even featured as the front cover of issue #20 back in September '02.

Plenty of time has passed since then and leaps and bounds have been made in the graphics world.

Nowadays, Matrox make a range of multi-monitor products ranging from the humble work station orientated graphics card, to the remote graphics unit (RGU) and then through to the graphics expansion module (GXM). The GXM primordial pool is where the TripleHead2Go has evolved from.

The TripleHead2Go (TH2G) features a less intrusive multi-monitor solution. It does not bind you to a work station graphics card that is unsuitable for gaming, nor does it lock you into either NVIDIA or ATI graphics cards. Furthermore, it does not discriminate between a desktop or laptop graphics output – it simply just needs a VGA or DVI video signal to work its magic.

As such, we hooked up the TH2G to the output from our test bench's 8800GTX and then attached three Samsung SyncMaster 940B 19" 4:3 ratio monitors running the native resolution of 1280 x 1024.

During the setup phase, we experienced one hiccup, a very frustrating one to say the least.

The USB connection used to power the TH2G requires a very specific level of power output. For reasons not clearly apparent, the TH2G did not wish to play ball with the rear USB ports of our labs bench EVGA 680i SLI motherboard. To fix this issue, we utilised the USB ports of the Pioneer DreamBook D90 which fixed the issue.

Once this hurdle was passed, the setup and configuration for both Windows desktop operation as well as 'Surround Gaming', as Matrox call it, was very easy and the supplied software is capable of changing game configuration files to utilise the 3840 x 1024 resolution.

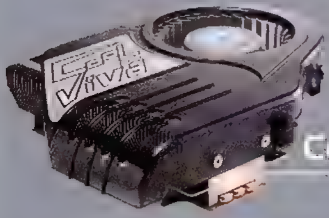
Fully setup and operational, we took the system for a spin through a number of games including Company of Heroes, Oblivion and Call or Juarez – they all looked stunning and the triple monitor gaming experience is something to be seen to be truly understood. It was on par with the immersive sense of gaming on large widescreen panels such as 24", 27" and 30", however in a more unique way.

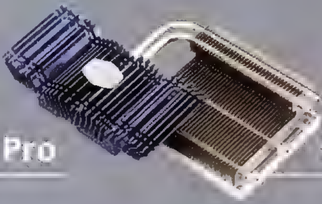
A neat idea, though costly after adding up the cost of the additional monitors, this is only something you'd get into if you were truly going to use the full potential available.

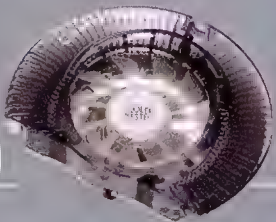
SCORE 7.0 OUT OF 10

Best cooling performance
rapid response time, absolute game competition

CeBIT australia X-20


CoolViva Pro


CoolViva Z1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	YNOT Computer Systems	08 9330 7666	www.ycs.net.au

XFX 8800GTS

XFX 8800GTS 640MB XXX Edition

SPECS

Price **$734** Street Price **$682**
Supplier **XFX**
Website **www.xfxforce.com**
Specifications **600MHz core; 1900MHz memory; 640MB GDDR3; 2 x dual-link DVI**

With all of NVIDIA's 8800 series video cards being manufactured by either Foxconn or Flextronics and then sold to vendors like XFX for re-branding or overclocking, the rise of factory overclocked video cards as a means of product differentiation has finally reached saturation point. XFX though seems to have mastered the art of the factory overclock.

The 640MB XFX 8800GTS XXX Edition comes factory overclocked with a core clock speed of 600MHz and a memory clock speed of 1900Mhz effective, up from the stock speeds of 500MHz and 1600MHz respectively. This makes this 640MB 8800GTS one of the fastest available at out-of the-box speeds. Sure, there is the possibility to overclock to these levels on a regular 640MB 8800GTS but as with all overclocking, definitive results are not guaranteed.

On our 3GHz dual core system with 2GB DDR2 RAM running at 1000MHz with timings of 4-4-4-10, the 8800GTS scored 8200 3DMark06 1280 x 1024. Running the ever popular Company of Heroes at resolutions of 1280 x 1024 and 1680 x 1050 scored 59.1fps and 59.8fps respectively, which shows the card's ability to handle higher resolutions with ease.

We were able to push this card even further, right up to speeds of 660MHz core clock and 2200MHz effective memory clock using stock cooling, with no artifacts in 3DMark06. This surprised us as most top of the line overclocked cards, like this one, have already been pushed to their absolute limits. Aftermarket cooling would be recommended just to ensure stability at these somewhat crazy speeds.

Being one of the fastest factory overclocked 640MB 8800GTSs is a double-edged sword for XFX's 640MB 8800GTS XXX Edition. On the one hand it has out-of-the-box performance that will wet your pants with joy, combined with great overclocking potential, depending on pure luck of course. But all this does come at a pretty hefty price, so high that most people would probably forgo the XFX 640MB 8800GTS XXX and either take the safe option and get a stock 640MB 8800GTS to overclock or pay that little bit extra and go for the beefier 8800GTX. **DV**

SCORE **7.0** OUT OF 10

SWIFTECH H20 120

Swiftech H20 120 Compact

SPECS

Price **$199** Street Price **$199**
Supplier **PC Case Gear**
Website **www.pccasegear.com**
Specifications **120mm radiator/ reservoir with fan, copper waterblock/pump, compatible with Socket 775/754/939/AM2/940/F**

Self-contained watercooling kits have always been the laughing stock of the overclocking community, with results universally worse than cheaper high end aftermarket heatsinks.

Swiftech, purveyor of quality water cooling products, hopes to change all that with their own self contained watercooling unit, the H20 120 Compact.

The H20 120 Compact features a 120mm radiator with built-in reservoir and a self-powered waterblock compatible with all current CPU's. The waterblock is connected to the radiator using 3/8" tubing with anti-kink coils, which unlike previous self-contained watercooling kits, can be re-filled if and when it is required.

Putting the H20 120 Compact up against our quad core CPU running at 3GHz (333MHz FSB on a multiplier of 9 with 1.4v vCore) gave an idle temp of 43.5 degrees and a load temp of 64.5 degrees. Both idle and load temperatures were averaged across all four cores with CoreTemp 0.94 used to measure temps and a wPrime 1024M run used for load temps.

The H20 120 Compact has two major flaws due to its pricing and design. Because the pump is located directly above the waterblock, a second heat source is present and would have a negative affect on the temperatures once you got the kit up and running.

We noticed that the interior of the radiator was made of aluminum. This, combined with the copper base of the waterblock meant that a galvanic cell is present within this kit, which would also have a negative effect on performance over time due to the corrosion that would occur.

Ensuring that the right corrosion inhibitor, otherwise known as coolant, is used and replacing it periodically should prolong this effect from occurring.

Swiftech's H20 120 Compact just shows that the curse of self contained watercooling units still linger as similar or better performance is readily available from cheaper high end heatsinks. Those looking for the best performance on water would still look towards a custom-built kit or one of Swiftech's more expensive kits. The H20 120 Compact is best suited for those that want to take their very first baby steps into the world of watercooling. **DV**

SCORE **6.0** OUT OF 10

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INGRAM MICRO

Logitech G9

SPECS

Price **$169** Street Price **$115**
Supplier **Logitech**
Website **www.logitech.com**
Specifications **9 programmable buttons; 200-3200 dpi; 1,000 USB reports/sec; weight tuning up to 28 grams; on-board memory.**

Logitech rarely fails at great industrial design. The Swiss company almost always nails it for design, innovation and outright quality. After many years at the top of the mouse pile with the flowing organic lines that originally debuted with the venerable MX series, Logi is forging off in a new style direction. The new style is more aggressive and angular. It's a tougher, sci-fi look, and is in stark contrast to the old models that just screamed "state of the ergonomic art".

It took us a while to learn to love the looks of the new G9, but making the leap is that, to use, it's simply sheer bloody perfection. The nuts and bolts driving the G9 is a collection of the pinnacle of mouse technologies. There's on the fly adjustable dpi, from a gaming rock steady 200, up to an ultra precise 3,200 dpi. The laser Logitech uses is a matured technology and it's impossible to imagine a smoother freer flowing cursor movement. The USB reporting rate is 1,000 samples per second. This allows for its claimed max acceleration of 20G and max speed of up to 65 inches per second. This envelope-pushing mouse engine is complemented by big fat wide Teflon feet. They're full width and on any decent mouse surface the G9 just glides like it's on air.

It's even got a cloth braided cord to help prevent tangles. The G9 gets the machinery right, alright, but the other thing of it all is that it takes 'customisable' to new heights. The pack has two outer shells, and apparently more will be offered for sale later. The 'Precision Grip' has a textured surface and hard sheen, while the 'XL' has a soft and smooth surface and is wider. We preferred the XL, but it's individual taste here. There's a weight cartridge that slots in from the back. There's 4 x 4g and 4 x 7g weights, for mixing and matching, or doing without completely. The G9 also has an improved version of the MicroGear scroll wheel, which gives you the choice of either smooth frictionless scrolling or clicky indents.

The G9 is pure mouse win. It's not pretty, but it is beautiful. **BM**

SCORE **9.0** **OUT OF 10**

Antec P190

SPECS

Price **$660** Street Price **$527**
Supplier **Altech**
Website **www.altech.com.au**
Specifications **6 x internal 3.5" bays, 1 x 3.5 external 3.5" bay, 4 x external 5.25" bays, Neo-Link 1200W power supply.**

It's the question that many a hardware enthusiast has raised - how to get two power supplies working together in one case?

Antec has decided to put those quizzical minds at ease with their P190, otherwise known as the P190+1200. The P190 features a Neo-Link 1200W power supply, which basically is one 650W non-modular power supply which takes care of the power to the motherboard and expansion cards, which is linked to another 550W semi-modular power supply which powers your drives and anything else you want to hook up.

Since the power supplies used are specially made for the P190, those looking for an easy way to install dual power supplies in their own cases will still need to continue on their quest.

Antec has decided to bring back their 200mm Big Boy side fan with three speed fan control for an encore performance, with its last appearance being on the Antec Nine Hundred gaming case.

The P190 also features 2 x top 140mm, 1 x rear 120mm fan and 1 x lower chamber 120mm fan. The top and rear fans also have a three speed fan control located at the top rear of the case.

Due to its depth, the Big Boy fan may just be a bit too obese for those with tower heatsinks, As are result, a heatsink that pushes air from the top down would be recommended if you still wanted to use Big Boy's cooling power.

Antec also keeps those silence freaks happy with dual-layered insulation on the side panels as well as silicon grommets for the drives. This insulation, as well as the dual power supplies and the Big Boy fan means that the P190 weighs in at almost 20kg without any additional components.

The P190 is a case that almost has it all – 1200W of grunt, fantastic cooling, silent performance and sexy styling. However, this case does have its deficiencies that you will need to be aware of before taking the plunge, but does still represent better value than buying a case with less features and a 1200W power supply separately. **DV**

SCORE **8.5** **OUT OF 10**

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GeForce 8600GTS *Overclocked*

With a stadium style heat pipe fan, 10.8 billion/sec texture fill rate and intergalactic bandwidth, the 8600GTS delivers graphics that are absolutely "out of this world!"

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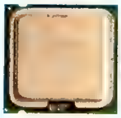
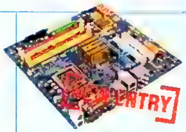
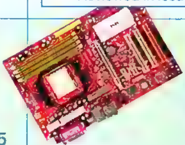
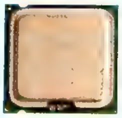
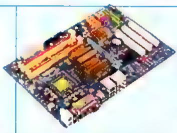
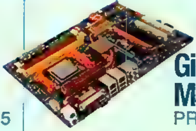
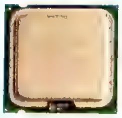
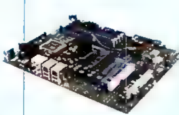
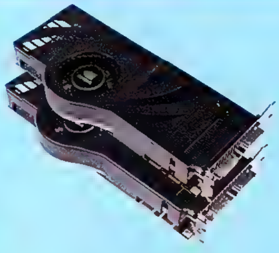
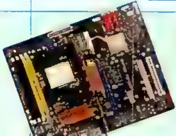
TOMORROW'S TECHNOLOGIES - TODAY

ATOMIC KITLOG

Our choice for the best gear the land has to offer

There's nothing sexier than new kit. And whether you need to horde your pennies (Budget), want the most power for your dollar (Performance) or own a small mansion and a collection of sports cars (Extreme), we're here to help with this handy matrix of *Atomic* recommended products. You may find your needs fall between categories – that's okay, just mix and match to suit your budget! Each piece of kit has been reviewed hands-on in *Atomic*, so if you want to learn more, look up the issue and page number listed.

		CPUs	Motherboards	Memory	Video cards
BUDGET *I can't afford to eat... gimme gear!*	intel	 **Intel Core 2 Duo** PRICE $100-$480 Stretch a little further and buy yourself a Core 2 Duo – you'll be thanking yourself later. The E4400 is the cheap ticket to speed, at $165.	 **GIGABYTE GA-G33M-DS2R** PRICE: $165 Using the G33 northbridge and has overclocking performance like its full ATX brethren, this Micro-ATX offering is extraordinarily hard to pass up. Reviewed in *Issue 81 – Page 52*	 **Corsair Twin2X 1024MB 6400 Pro** PRICE $198 Corsair has a history of providing nice, stable and fiesty sticks of random access memory joy. These RAM sticks are EPP compliant, have low latency and are nicely overclockable. 800MHz of fun for everyone! Reviewed in *Issue 69 – Page 51*	 **Powercolor X1950 Pro** PRICE $245 The X1950 Pro is nothing short of fantastic. Mind you, this could just as easily be the 7950GT, so watch this space in case the NVIDIA card drops in price. Reviewed in *Issue 71 – Page 47*
	AMD	 **AMD Athlon 64 AM2 X2** PRICE $135-335 Cheap CPUs are a wonderful thing, and the X2s are now wonderfully cheap. The 3600+ is your budget baby at about $85.	 **MSI K9N Neo F** PRICE $113 Excellent performance from a budget board, with plenty of legacy slots for upgraders. Don't expect to overclock though. Reviewed in *Issue 68 – Page 33*		
PERFORMANCE *Hardware that bangs the best for buck.*	intel	 **Intel Core 2 Quad** PRICE $300-680 Core 2 Quad – a processing powerhouse, now affordable and overclockable like buggery. The Q6600 is the best buy, at about $336.	 **Gigabyte GA-P35-DS3R** PRICE $200 The P35-DS3R is a cheap overclocker that can't be ignored. Buy a Core 2 Quad Q6600 and go nuts! Reviewed in *Issue 80 – Page 55*	 **TEAM Xtreem Dark PC2-6400 C4** PRICE $289 Cheap, overclockable and good lookin' to boot. The modules fill the void that was previously left between cheap value RAMand enthusiast overclocking kits. Reviewed in *Issue 80 – Page 56*	 **GeForce 8800GTS 320MB** PRICE $410 DirectX 10 for the mainstream. 320MB is as good as 640MB in most situations – opt for the 640MB if you're going to play above 1600x1200. Reviewed in *Issue 76 – Page 58*
	AMD	 **AMD Athlon 64 AM2 X2** PRICE $135-335 The X2 series are still fantastic chips, and in the face of the Intel threat are now going for cheap. The 6000+ is your current sweet spot at about $235.	 **Gigabyte GA-M59SLI-S5** PRICE $250 Gigabyte delivers yet another affordable, feature-filled wonder of the 21st century. Reviewed in *Issue 66 – Page 39*		
EXTREME *Gimme power. Money is no object.*	intel	 **Intel Core 2 Extreme QX6850** PRICE $1478 Extremely powerful and a strong overclocker to boot. The G0 stepping is truly drool worthy. Reviewed in *Issue 80 – Page 52*	 **EVGA nForce 680i** PRICE $435 Stupidly over-featured and fast, if you've got the cash, then plonk it down here. Reviewed in *Issue 72 – Page 47*	 **Corsair Dominator Twin2X 10,000** PRICE $1016 Crazy speed sticks that will also happily do 1T/800MHz/3-3-3-3. Comes with a fan attachment to keep things cool! Reviewed in *Issue 77 – Page 58*	 **XFX GeForce 8800GTX Ultra XXX Edition SLI** PRICE $1459x2 This is far and away the most powerful graphics card on the market, but be willing to sacrifice your entire retirement fund for the privilege of having one of these tearing up your screen. Reviewed in *Issue 78 – Page 59*
	AMD	 **AMD Athlon 64 FX-62** PRICE $1072 Sadly gets beaten by a mid range Core 2 Duo, but still the top of AMD's pile. Reviewed in *Issue 66 – Page 39*	 **ASUS M2N32 SLI Deluxe** PRICE $290 Perfection in a motherboard. Beautifully laid out and overclockable to boot. Reviewed in *Issue 68 – Page 35*		

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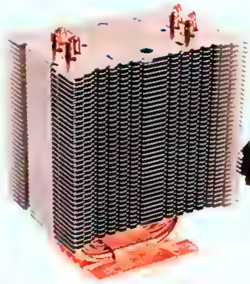
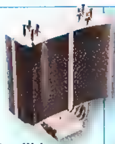
Coolers



Noctua NH-U9F
PRICE $80

It may only be 90mm, but its cooling power is exemplary, coming in only slightly behind its 120mm brother.

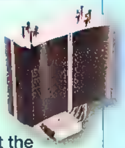
Reviewed in *Issue 72 – Page 42*



Thermalright Ultra 120
PRICE $75

Tower cooling that will keep your tower cool. Whack a Nexus 120mm fan on for near silent cooling.

Reviewed in *Issue 72 – Page 42*



Thermalright Ultra 120
PRICE $85

Make sure you get the optional AM2 bracket (hence the higher price). Grab that same Nexus fan.

Reviewed in *Issue 72 – Page 42*

Asetek Vapochill Lightspeed
PRICE $1020

Vapour phase change. Ooooh. Vapour. Phase. Change. No matter how many times you say it, it's still cool (pun!)

Reviewed in *Issue 64 – Page 38*

Cool-Trek Vostok
PRICE $199

Until more extreme cooling systems come along that are AM2 compatible, this little kit will have to fill the gap. Make sure you get the updated mounting kit.

Reviewed in *Issue 68 – Page 41*

System drives

Samsung HD160JJ 160GB
PRICE $80

Super quiet and yet still fast, the 160GB Samsung offers excellent value for money.

Reviewed in *Issue 69 – Page 40*

Seagate Barracuda 7200.10 320GB
PRICE $130

Seagate's fancy new technology makes this beast both fat and fast. Mmm, toasty.

Reviewed in *Issue 69 – Page 40*

Western Digital Raptor WD1500ADFD
PRICE $330x2

Dear lord. The performance king hath cometh, short of whacking in a SCSI. Buy two and RAID 'em.

Reviewed in *Issue 62 – Page 40*

Displays

Samsung 931C
PRICE $405

2ms of raging colour gamuts and beautifully smooth tonality that will make you weep with joy and hug strangers.

Reviewed in *Issue 70 – Page 56*

Samsung 244T
PRICE $1477

Brilliance at 24", the 244T offers 6ms gaming, a wonderful gamut and more inputs than an alien hooker.

Reviewed in *Issue 69 – Page 48*

Hewlett Packard LP3065
PRICE $2718

Thirty inches, 2560 x 1600, 8ms G2G. If you can handle the size and cost to run this massive beauty, you won't be disappointed.

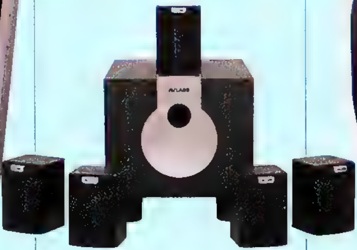
Reviewed in *Issue 76 – Page 53*

Speakers

Steelsound 5Hv2
PRICE $120

Awesome gaming audio performance on a shoestring budget. Phenomenal 'phones.

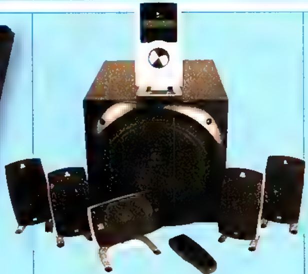
Reviewed in *Issue 73 – Page 43*



AVLabs AVL325
PRICE $165

While it can't hold a candle to the Z-5500D, with a price this low there's no excuse not to jump to 5.1.

Reviewed in *Issue 64 – Page 50*

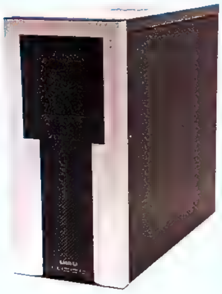


Logitech Z-5500D
PRICE $430

Able to play the 'liquid gold' that is DTS 96KHz/24-bit, this 5.1 beast can wreck both home and hearing alike with equal impunity.

Reviewed in *Issue 48 – Page 56*

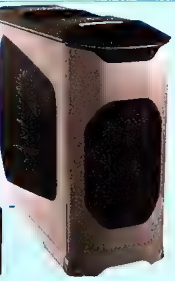
Cases



Lian Li PC-7S
PRICE $138

Quality, elegance, refinement and style. The trademarks of a Lian Li case, now available at an entry-level price.

Reviewed in *Issue 79 – Page 46*



Cooler Master Stacker 830
PRICE $290

Like the Stacker before it, this sensational Stacker stacks sumptuous specifications salaciously.

Reviewed in *Issue 61 – Page 36*

Silverstone TJ07
PRICE $420

The Silverstone Temjin TJ07 is a huge hulking beast that shows you mean business in the finest style. Impeccable finish and plenty of room means win.

Reviewed in *Issue 65 – Page 49*

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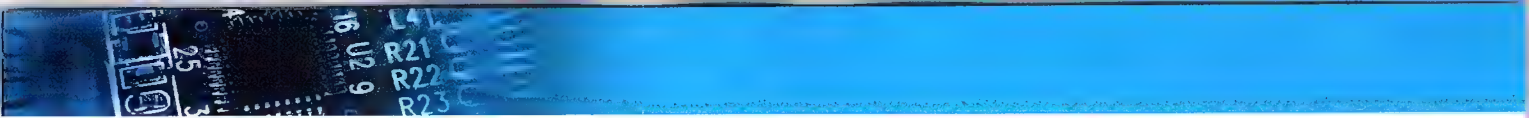

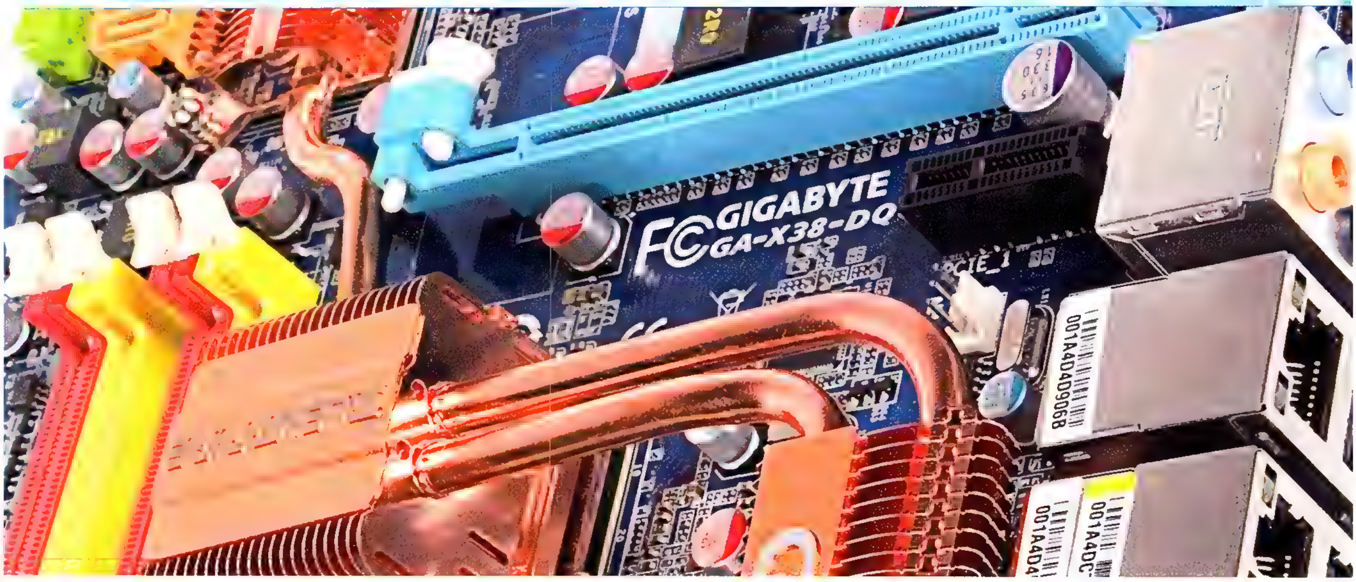

'Xtreme' performance, or just naughty marketing?

Josh Collins blasphemes with frustration in the face of the silicon Gods.

What the funk is going on? We have Intel with AMD licensed CrossFire branded all over their chipsets, NVIDIA not caving into Intel's demand for SLI licensing and cornering a market they've stated they want to expand. All the while, AMD is chilling out and not touching the Intel LGA775 platform with a 40 foot pole, after the flop that was the ATI RD600 chipset – not to mention the sheer fact Intel is its direct competitor!

Chipsets are crucial to pulling together all that groovy power from processors, memory and graphics cards, but what the hell is going on with the current market? For starters, tests have shown minimal gains between the Intel P965 and P35 chipsets, and if our initial impression of the X38 chipset from this month is anything to go by, there is again a sweet bugger all performance gain between P35 and X38.

The only truly notable gain that can be seen in the specs list is the introduction of the PCI-E 2.0 standard. Giving further bandwidth to the PCI-E standard, but like the change from AGP to PCI-E, the current standard hasn't yet reached its bandwidth limits. From this move, we can only speculate that there is the expectation to hit some outlandish amounts of data throughput from the next generation of GPUs.

> we can't push the screaming voice out of our head that tortures us with the words: *'but why?'*

Further adding to the pickles in the pie is the overly promoted official support for 1600FSB 45nm processors strictly on the X38 chipset. But just like the change from 1066FSB to 1333FSB on P965, there is no logical or technical reason openly discussed as to why the 1600FSB chips cannot be used on the P35 chipset, which is stated to function with 1333FSB 45nm processors. Especially given the fact that both chipsets are based on the Bearlake micro-architecture and both processors are derivatives of the Core micro-architecture.

It's not surprising then, to see manufacturers such as GIGABYTE and ASUS openly stating the support of 1333FSB 45nm (yet to be released) processors on P35-based motherboards, and saying nothing in regards to 1600FSB – can anyone say 'P965 round two'? All the while, Intel plays ignorant, stating that X38 is necessary for 1600FSB processors – just like it did with the P965 and 1333FSB situation. Hell, who knows, we might even see 1600FSB support on the ol' P965 chipset. Speaking of steps back, let's jump back to the chipset performance differences. No doubt many of you reading this have already heard of the successor to the X38 chipset, the X48. Unfortunately we can't seem to push the screaming voice out of our head that tortures us with the words: *'but why?'*

With confirmation recently that X48 is simply cherry picked X38 cores, technically and specification-wise being the same, chosen for their ability to be overclocked, then why in the name of all things holy is it being touted as a huge spectacular release? Unless it also reigns in ridiculous FSB headroom, it will only go down as another gauging attempt on the enthusiast's hip pocket.

But what's happening on the AMD based desktop platform? Well, if I could be frank, I'd say 'sweet fuck all', but that's not fair. On the positive side of AMD's stale desktop progression and the whipping from Intel's Core processors, the price to build a fairly high spec and capable gaming machine is much lower overall then the Intel offerings, once the motherboard is added to the CPU cost part of the equation. Our fingers can only be crossed in the hope that the introduction of even more chipsets to Intel's desktop platform, including the not yet mentioned NVIDIA 7-series, can only drive prices of motherboards down rather then following the trend of bumping them up.

God save our souls, should we be paying double the price of a processor for a decent motherboard!

There's no such thing as silicon augmentation in the dreams Josh has.
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WE'RE NOT GONNA TAKE IT ANYMORE!

The Great Apathetic Rebellion

Daniel Rutter tries desperately to get his cow under control.

As every nerd knows, copy-control systems work backwards. They make ripped-off stuff better than the legal version.

Your legally-purchased copy-protected game discs can't be backed up, but the cracked version on The Pirate Bay sure can.

Legitimate Windows users enjoy the 'Genuine Advantage' of having to validate their OS online or over the phone. Meanwhile, Captain Hook just downloads the fully patched and polished Corporate Edition, which doesn't even need a CD key, for free.

Even just using DVD Shrink to make yourself a backup copy of your paid-for DVD without the useless intro menu is now illegal in two different ways, here in Australia. When we 'harmonised' our copyright law with the USA's at the beginning of 2007, we adopted a DMCA-style prohibition against circumventing any anti-copy technology, even if the copying would otherwise be legal.

So if you make a personal backup of purchased software that doesn't have copy control crap on it, you're in the clear. But if you back up something that's 'protected', you're breaking the law.

This situation is unique in the commercial world. Other things that make it harder for you to use a product usually do so as a side effect of some other, desirable, outcome.

Cost cutting, say. Volume control buttons are harder to use than a knob, but they're also cheaper.

And hard-to-open blister packaging, to pick another familiar example, is at least partly *meant* to be hard to open. It makes it harder for people to shoplift, and makes it less likely that the product will be damaged or fall out of its packaging during shipping.

Copy control, in contrast, just inconveniences honest users, while not affecting actual pirates. Almost all copy control also does *nothing whatsoever* to increase sales of the product. The only copy control system I can think of that actually *does* fight piracy is Internet-verified CD keys, which stop you from playing online games if you don't have a valid key.

So why do we keep seeing the lousy, counterproductive copy control systems - and why do companies keep coming up with *new* ones?

> “We'll see civil disobedience through apathy. The cows just don't care to be herded, any more”

I think it's because of a vicious circle.

Copy control encourages contempt for your customer. It's not as if you'd force this garbage on people you *respected*, after all. And contempt for your customer, in turn, encourages more copy control - because you can't trust those animals!

If this is the way you think, then you don't really care how hard it is for your customers to 'enjoy' your products. All that matters is that the customers keep buying. Which they will, because they're idiots. Marketing will always lead them where the marketers want them to go.

But P2P transfers, almost all of them copyright-infringing, now account for about a third of all Internet traffic. Plus almost 10 percent for good old newsgroups, almost all of whose traffic volume *also* breaks the law. YouTube accounts for about another 10 percent all by itself.

Un-DRMed access to music and computer games is not one of those Big Social Issues that result in real history-book revolutions, where the cows turn around and stomp their cow-herd into the mud. But the analogy holds up just fine if you think of the cows just... wandering off. All at once. To somewhere else.

We'll see civil disobedience through apathy. The cows just don't care to be herded, any more. The cow-herd can chase them and whack one or two with his stick, and probably get those ones back on the path. He can even go and get a gun and kill the lot of them, if he's really determined.

But the first option leaves him with one percent of his herd, and the second one leaves him with nothing.

This is what's happening, right now. The media conglomerates have been suing their customers right and left for years, but the herd continues to wander away.

When Dan grows up, he's going to Bovine University.
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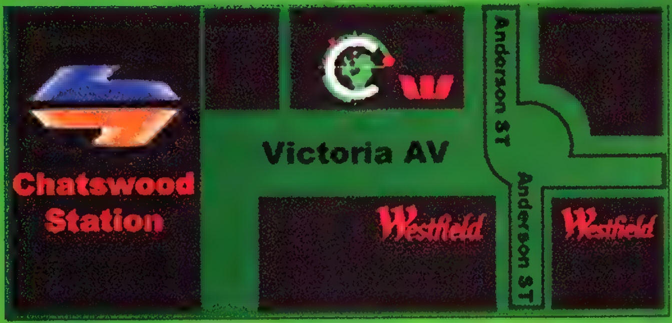

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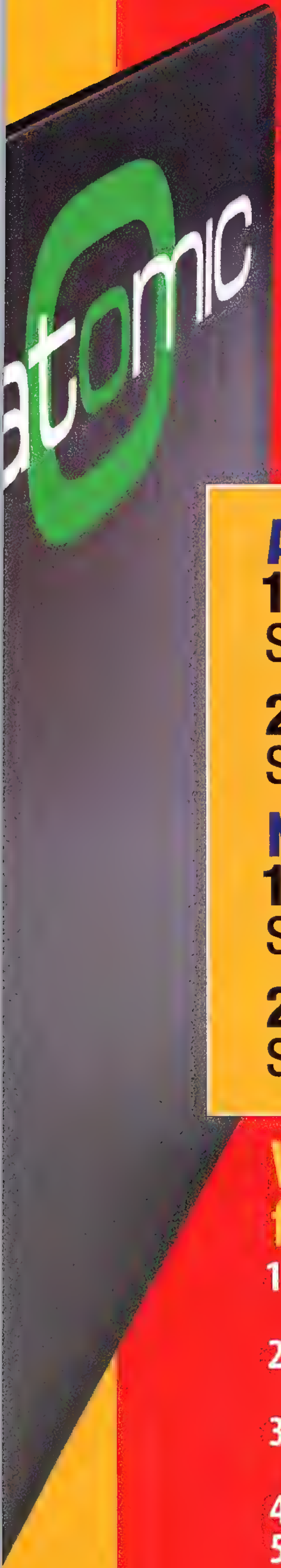

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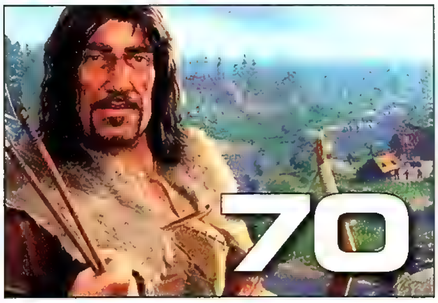
GAMEPLAY

GAMES, GAMING AND GAMERS COVERED ATOMIC-STYLE

Earlier this year, Atomic visited LucasArts HQ, to be shown Its Next Great Thing, Fracture. The company is betting the farm that terrain deformation is the ticket to your gaming satisfaction. It's a technically ambitious project, and Logan's done a wrap of where it's at and the deformable mountains it must climb.

Then there's Halo 3. You may have heard of it. It's a given that it's a superpolished state of the gaming art piece of perfection. It's a given everyone with a 360 will grab a copy. We reckon that's a cool thing. It's a gold-plated game, created by some of the very best developers the business has ever seen, and funded by the biggest bucks of all. It delivers.



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Kate bids adieu to Atomic this month to get on with the important business of being a Mum. She farewells us with a reality episode about just what it takes to be a games beta tester.

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This very beautiful RPG has been making a splash worldwide, and deserves to be experienced by gamers of all persuasions. It's a wonderfully non-linear world of exploration and adventure, with a very nicely balanced combat system and a very decent back story and character set.

We thoroughly enjoyed playing it, and so should you. Thanks to our mates at Red Ant, we've got 5 copies of the PC version to give away to 5 lucky adventurers.

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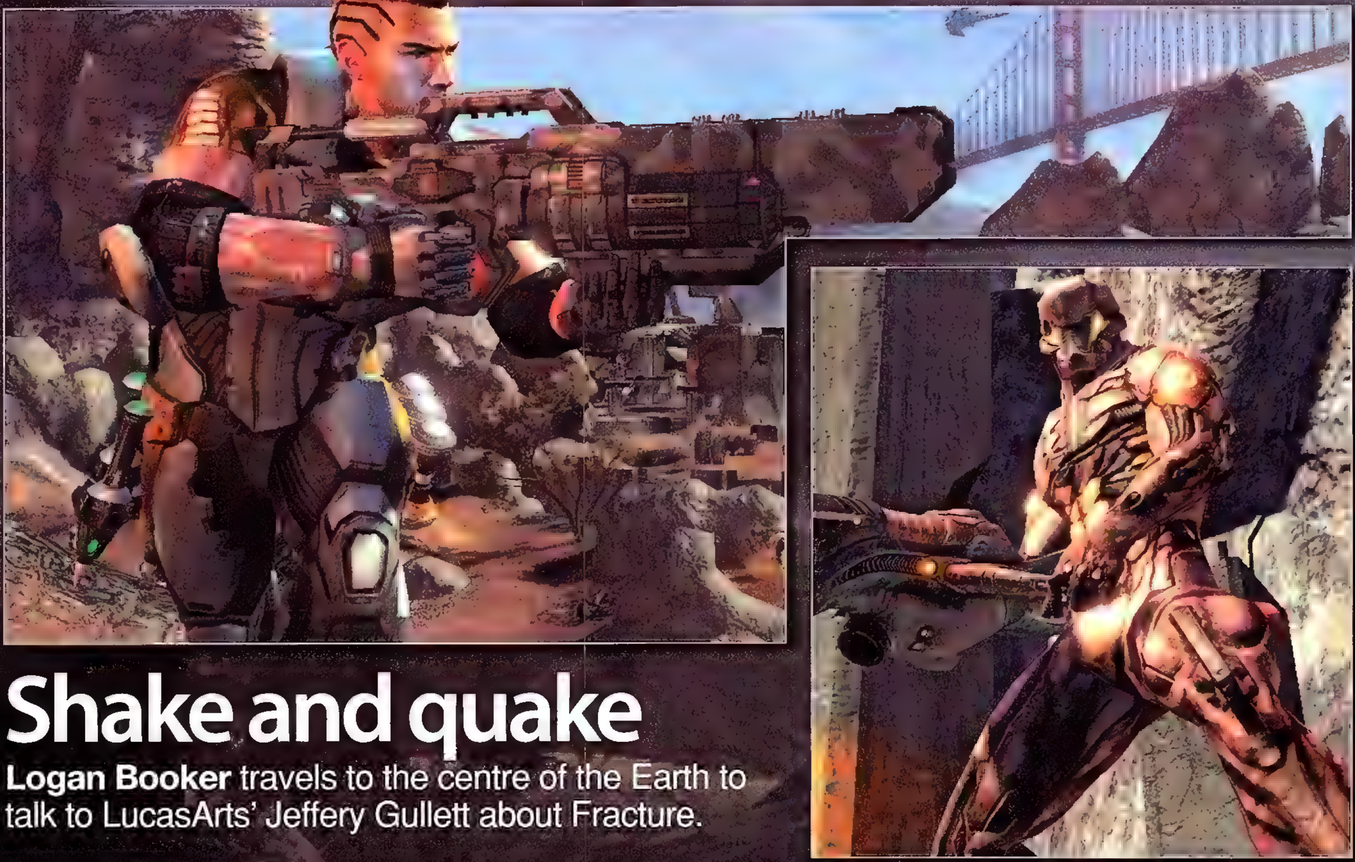


Shake and quake

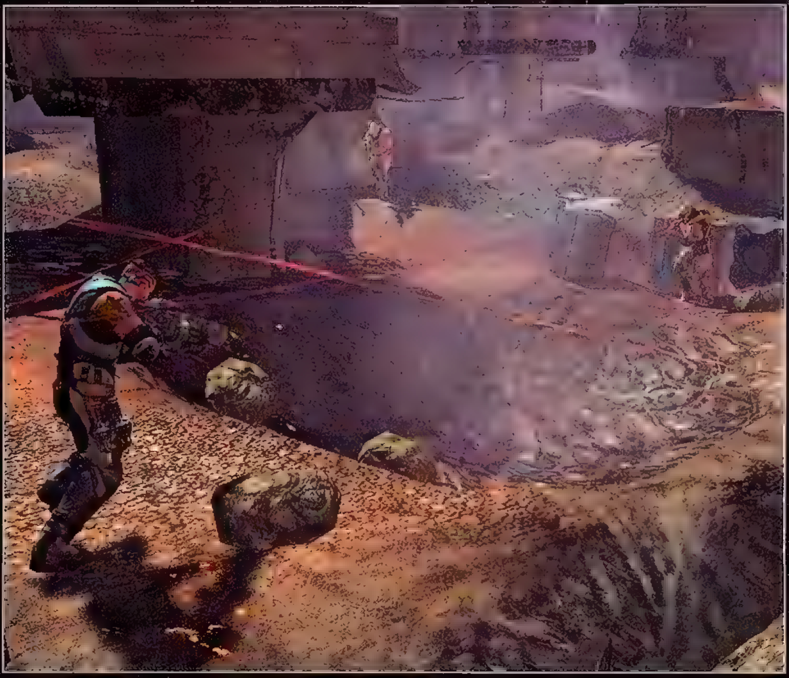
Logan Booker travels to the centre of the Earth to talk to LucasArts' Jeffery Gullett about Fracture.

Above Fracture takes the cliched and bog standard space marine character precisely nowhere, but instead wins at the ground around him.

Surely in this age of next-gen consoles that bristle with multiple processors and competent GPUs, there's a developer out there willing to give the whole destructible terrain thing another shot.

We saw an ambitious, but rather limited attempt in Volition's Red Faction back in 2001, but nothing since. We think six years is more than enough time to have rethink of the whole concept, and, as long as you're not 3D Realms, develop an actual game.

Turns out we were right.



Deformation action

In fact, our estimates were extremely conservative. LucasArts' Fracture, the game looking to make destructible terrain awesome again, has been in development for only two years, with a planned release date of early 2008. That's a quick turnaround when you consider what the studio is trying to achieve.

'Terrain deformation (TD) puts the power in the players' hands,' says Jeffery Gullett, assistant producer at LucasArts. While the grunt work on the title is being done by MechAssault developer Day 1 Studios, LucasArts has an external production team managing the overall project.

'It is the player that will decide where to make a stand against the enemy, and where to create cover to hide behind. For a designer, the challenge becomes creating levels that empower the player's choices, rather than crafting a specific experience.'

Fracture forgoes the destruction of actual structures, embracing the more impressive goal of allowing the player to maul the ground around them. Players will be able to create craters, hills and pillars using a variety of special explosives, called tectonic grenades.

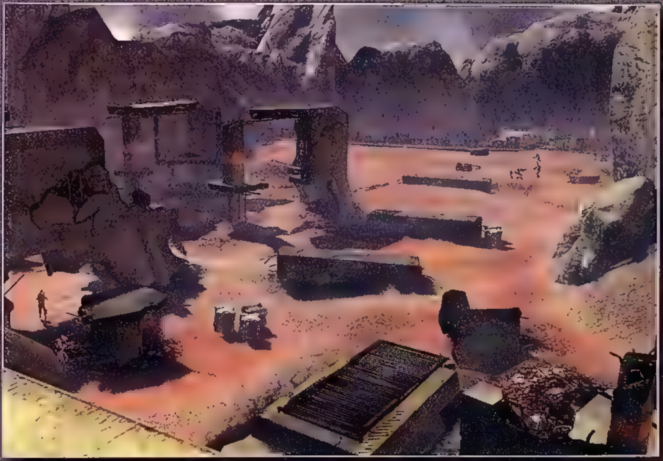
'In other games, destruction of the terrain was only useful or possible in specific, pre-determined locations. Fracture allows the player to choose where and how to deform the terrain,' says Gullett.

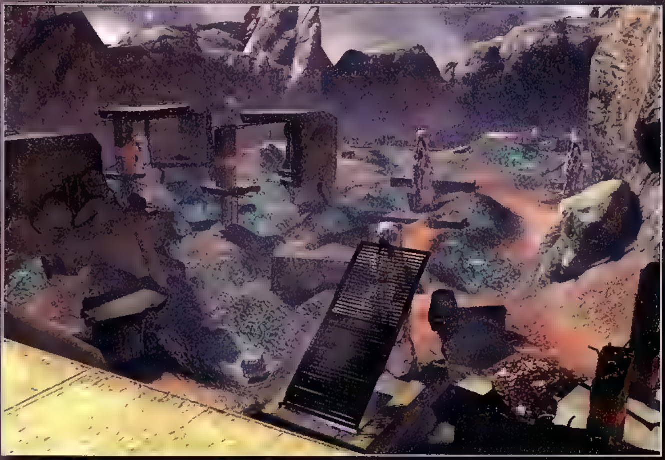
He also promises robust single and multiplayer modes - a compelling story going hand-in-hand with LucasArts strengths, while Day 1's experience with MP mechanics will reinforce the latter, thanks to its work on MA.

Shatter matters

Despair, the engine behind Fracture, is custom built by Day 1 Studios, with physics handled by the industry standard Havok middleware.

Parallel processing has been a huge focus for the





Above Before and after terrain deformation. All the damage done was inflicted during gameplay, all for tactical advantage.

developer. 'Fracture pushes both consoles to their limits,' says Gullett. 'We have a whole system for managing the cores and SPEs, to ensure that tasks get divided evenly and run in the proper order. Tasks like rendering, animation, physics, and terrain deformation lend themselves particularly well to parallel processing.'

Understandably, TD is painfully demanding. Gullett explains that the first step to managing TD was to take vertex computation, physics and rendering, divide them, and get them running asynchronously on separate processors.

'Then, we had to design highly efficient algorithms that could handle our heaviest load conditions. Finally, the code was hand-optimised to improve memory bandwidth and cache utilisation,' he says - the last of these being incredibly important for the PS3.

'On the 360, we dedicate an entire core just to TD, with physics, rendering and other tasks being spread across the cores as necessary.'

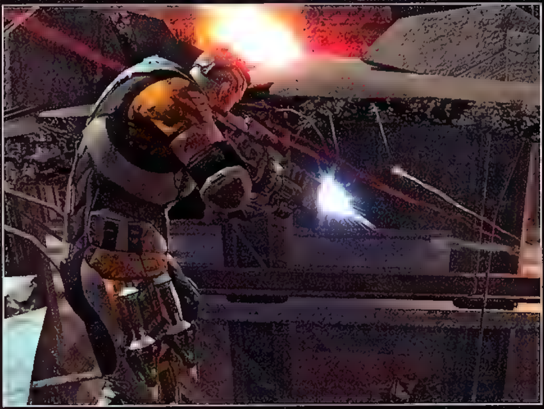
Fracture will also punish the PS3, to the point that even the cut-down PowerPC processor, originally designed to handle the console's SPEs, will be pushed as far as it can go.

Now, throw AI that has to be smart enough to make use of this constantly changing environment, and you have just an inkling of how vicious the game is.

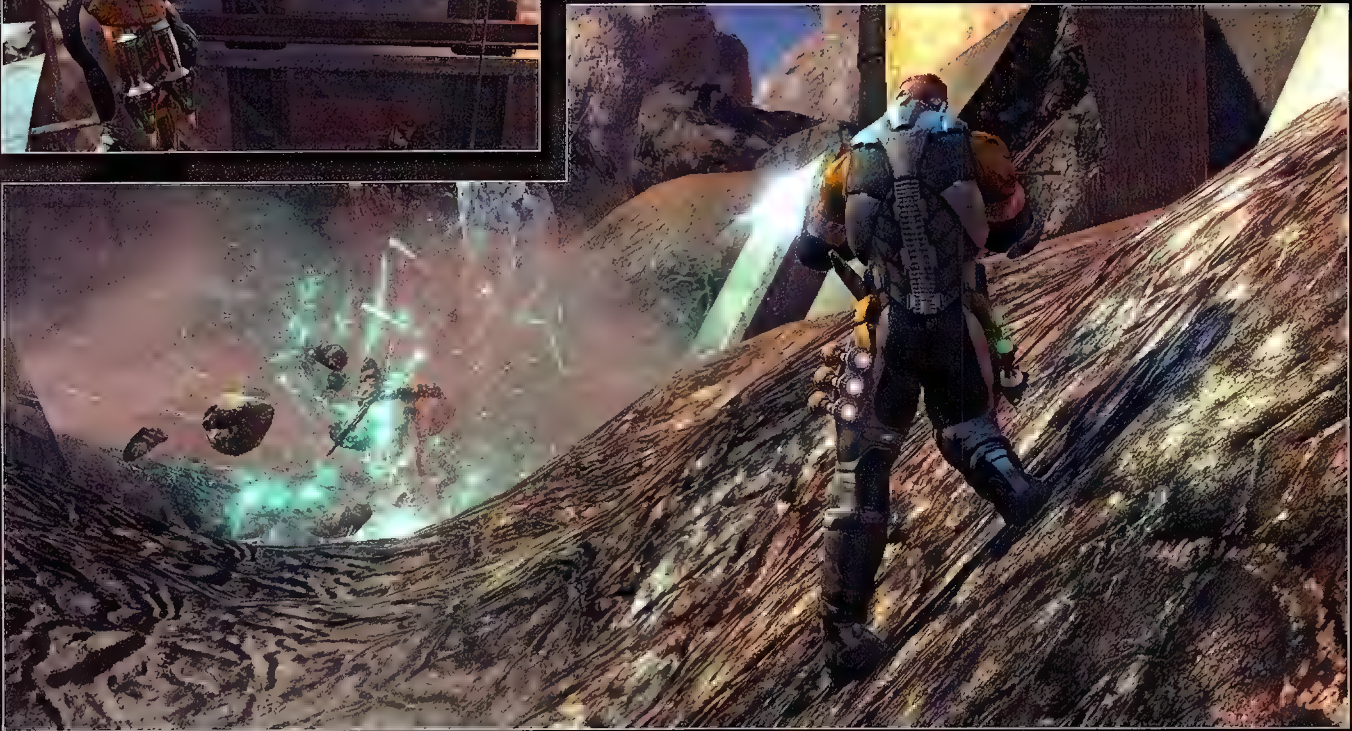
'As far as we know, Fracture will be the most computationally intensive game shipping in the foreseeable future,' Gullett says.

Time to rock

Currently, LucasArts and Day 1 are limiting the release platforms to the Xbox 360 and PS3, though we can't see any reason why Fracture couldn't make it on to PC. Regardless, Fracture is a unique title in the third-person shooter genre, and we hope that terrain deformation is just one, and not the only, part of a well-rounded and compelling game.



Below Letting rip with a TD weapon, simultaneously churning up the environment while making an enemy at one with it.



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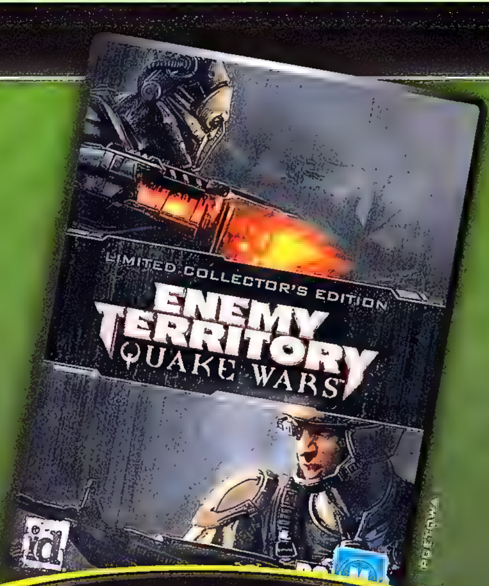

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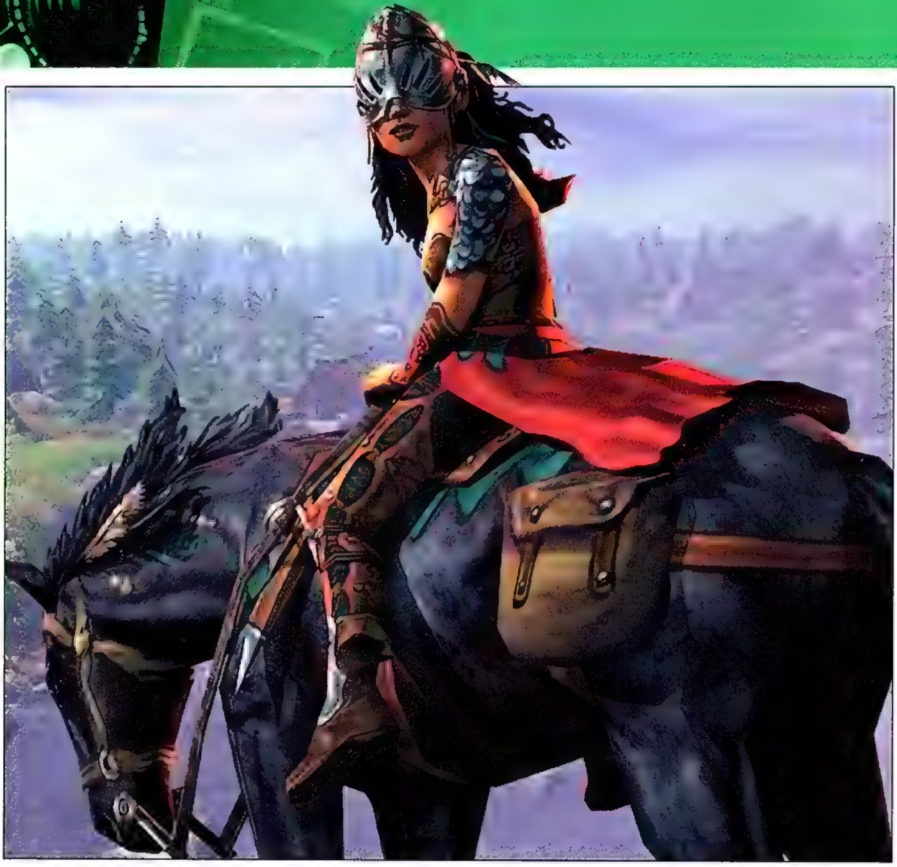
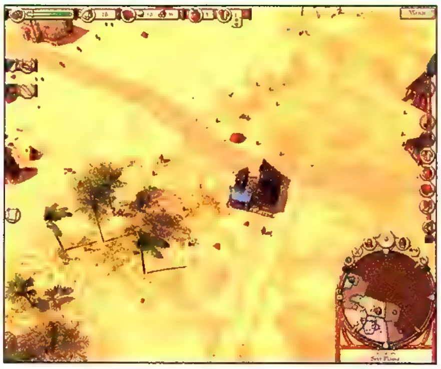
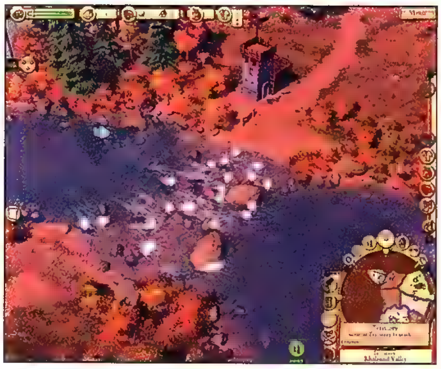
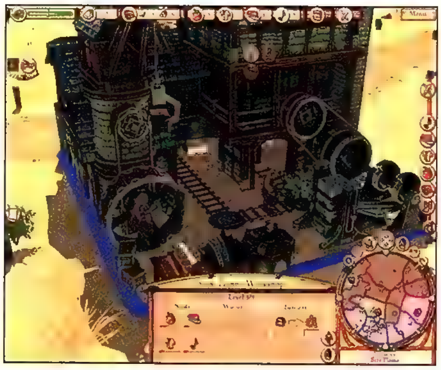








Settlers VI: Rise of an Empire

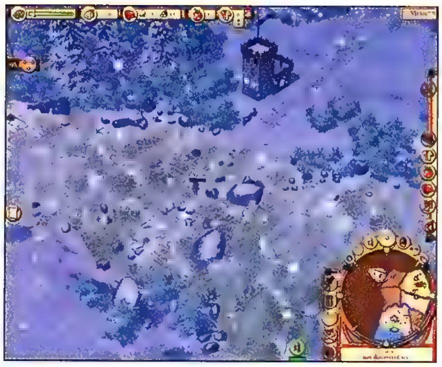
Robbie Grant remains unsettled by little people who really should be bigger.

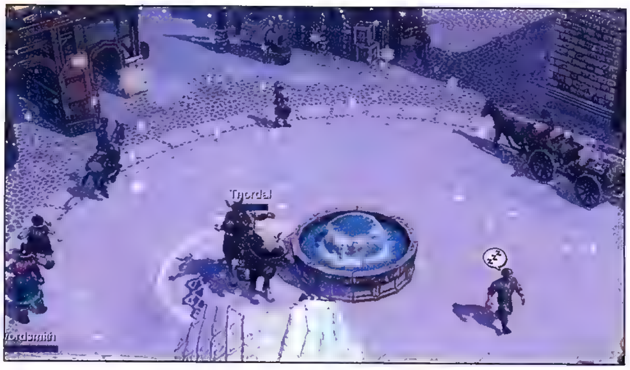
Build farms. Harvest spice. Construct additional pylons. Whatever the setting, the basic gameplay for strategy games doesn't tend to differ all that much to that which has been done before. So what does Blue Byte offer the gamer of today with Settlers VI?

Settlers VI is, as any Roman could easily attest, the sixth title in the much-vaunted "Settlers" series. While there are no pylons to be constructed, there are grain farms to be built, sheep to be shorn… and so on. Build buildings, feed, clothe and entertain the populace, and use your soldiers to obliterate your hapless enemy without mercy. It's a good recipe by all accounts, but unfortunately something is still missing here.

Graphically, this game is quite stunning. Lush scenery, detailed buildings, and a dynamic climate that will see rivers freeze over in winter and melt in summer, and snow gradually form on trees and buildings. This game comes across as quite polished, and most everything that has been put in works and works well. Unfortunately however, not everything has been put in.

Settlers VI is a game with some very notable limitations. Limitations on unit numbers are very





low, and your military unit types are limited to swordsmen and bowmen, with a small handful of siege weapon – which is fine in Settlers, a series that has not historically pushed the militaristic side of strategy gaming, but it still would have been nice to have some more strategic options. Things are much worse on the resource / production side of things however. Where previous games required you to keep an eye on a complex interplay of different unit types and industries, we are now given a handful of linear production paths. Wild game gets made into sausage. Iron gets made into weapons. Trees get made into buildings. Gone are the intermediate slaughterhouses, smelters and sawmills from previous games, with the end result being that this game feels decidedly 'dumbed-down' and repetitive. Couple this with a number of unintuitive gameplay mechanics, some dodgy pathing issues and a storyline that actually involves someone uttering the words '…we shall strike when he least expects it,' and you're left feeling that this is a game that could have been much more.

> "...with the end result being that this game feels decidedly 'dumbed-down' and repetitive."

Despite its flaws, this is still a nice, slow-paced game that may just appeal to those who have typically not enjoyed strategy games, or who are just getting into them. Youngsters would no doubt find a bit of appeal in its simplicity – it's not too complex nor too violent, but can be very satisfying in a Zen kind of way.

PC

Developer Blue Byte
Publisher Ubisoft
Website www.thesettlers.com

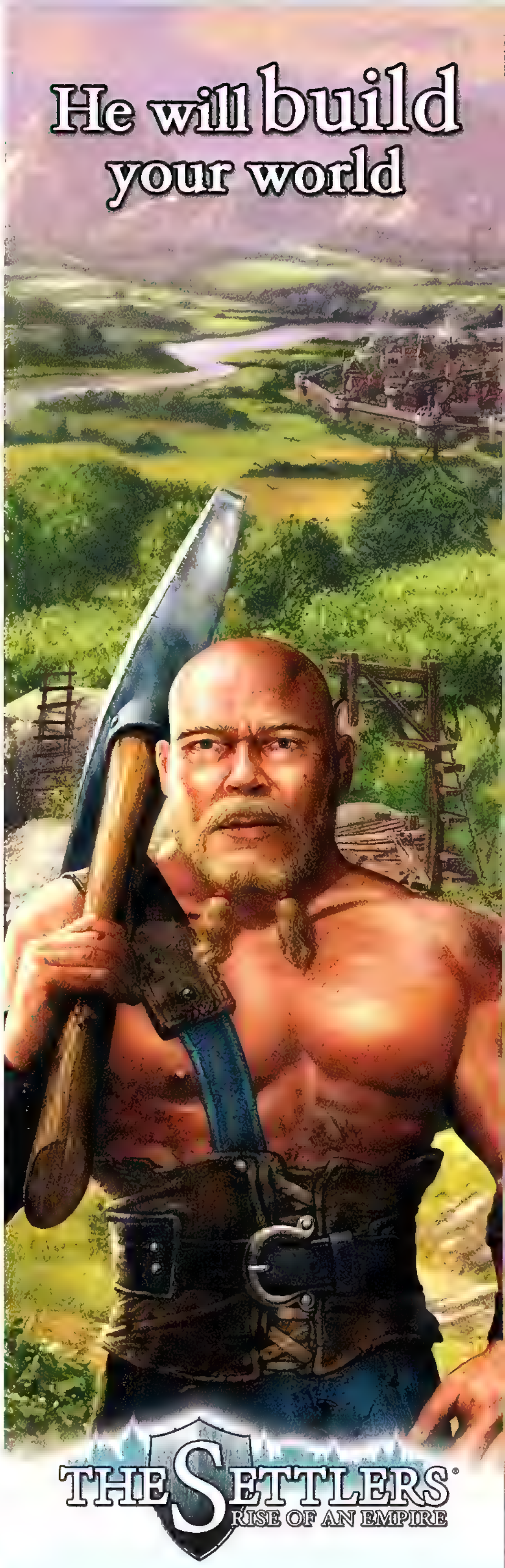
Recommended
P4 3.0GHz / A64 3400, 1GB RAM, 256MB DX9 vid card

VERDICT

✓ Streamlined gameplay; some interesting missions; captivating graphics

✗ "Strategy lite"; maps can feel cramped; long waits for production

SCORE 6.5 OUT OF 10



www.thesettlers.com

Games for Windows

PG Mild violence

UBISOFT

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Halo 3

Logan Booker watches as Halo comes 360.

After months of heavy, almost suffocating marketing by Microsoft, the third instalment in Bungie's Halo series is here.

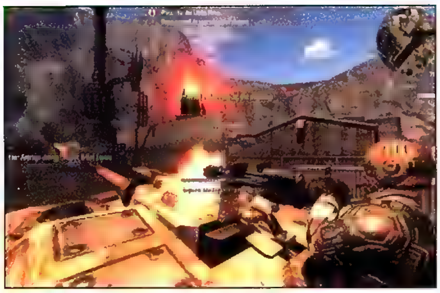
If you somehow missed the branded cans of Mountain Dew and the whole 'Believe' campaign, it's still unlikely that Halo 3's imminent arrival escaped your attention. In fact, if you own an Xbox 360, it's probably #1 on your September shopping list. This, as you'll find out, is a good thing.

Fundamentally, Halo 3 might as well be Halo 2, or even the original. You're still the Master Chief, and Earth is still under threat from alien attackers, having been conquered completely by the fearsome Covenant. The game is played from the same first-person perspective, and instead of a health bar, you have a weak shield that regenerates after a short period of hiding like a pansy. In single player, the meta-game of weapon juggling still exists, as does the gun carry limit of two.

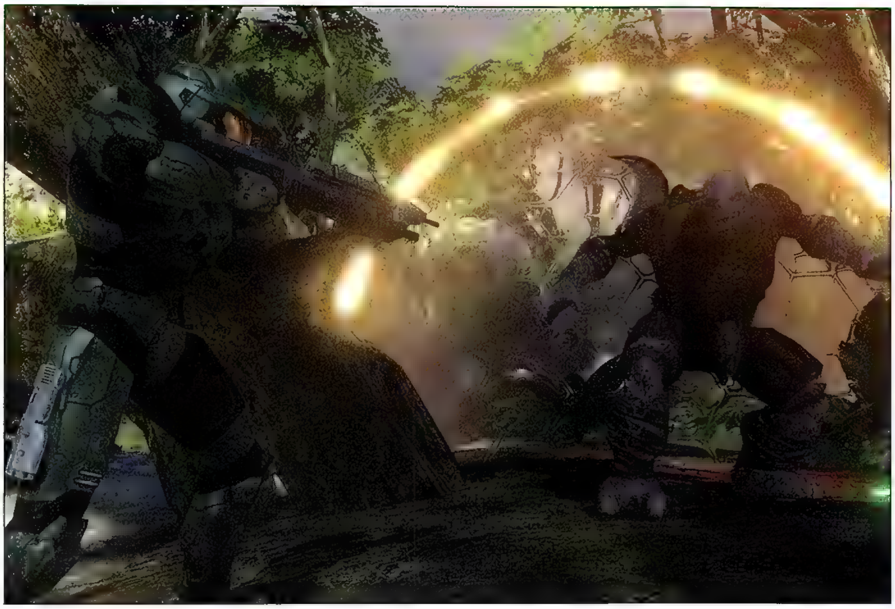
Multiplayer, perhaps, has seen the most work, the details of which we'll cover in just a moment.

The crux of the plot is the recent discovery of a mysterious artefact in Africa, one the Covenant appears to be fascinated by. It's up to the Chief of course to find out what the deal is, and it should come as no surprise that you'll have to slaughter hundreds of aliens on your way to it.

Apart from the basic enemies you'll fight, who sound completely out of place with their high-pitched whiny cries, the Master Chief will also face off against Hunters and Brutes. These tougher opponents tend to pack powerful weapons - usually explosive in nature - and on the harder difficulty modes of Heroic and Legendary, will require patience and attrition to defeat.



A few additions help spice the SP campaign: The Master Chief can now dual-wield any combination of small arms and carry a single 'special' item. These specials include deployable cover, bubble shields and regeneration auras, and come in handy in the game's more gruelling sections.

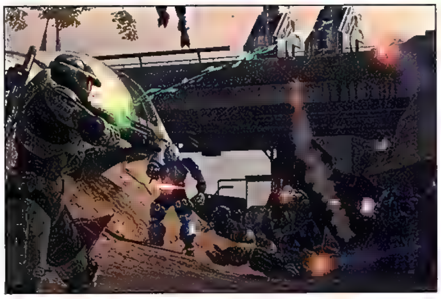


Checkpoints again serve as the save mechanic, and while they are mostly well placed, there are a few tricky areas, such as a fortified base very early in the game, that could have done with a few more. It also doesn't help that checkpoints sometimes fail to register your presence.

The series has always been the crowning jewel of multiplayer for Microsoft's console, and Halo 3 is light years ahead of its predecessor in this regard. Along with Slayer and Team Slayer, Bungie has introduced Infection, Oddball, Multi-Flag, Juggernaut, Ninjanaut and Team King modes, as well as a few others. Co-op multiplayer returns, packing support for four players using split-screen, system link or Xbox Live.

Some modes, such as Juggernaut and Ninjanaut, are loads of fun, requiring one player with enhanced abilities to face off against everyone else until they die; at which point the person who made the kill takes their place. Others game types, such as Infection (which replicates the Half-Life mod Zombic Panic!), suffer from pacing problems or are too basic or underdeveloped to hold one's attention for long. Regardless, the variety is not unwelcome.

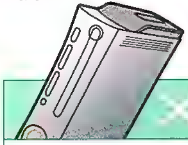
By far the most interesting of the new modes is Forge, where players can delete, add or move objects around a map at their leisure. Each map has an item budget that averages $100, with basic objects (barrels and guns) costing $2-$5 and vehicles between $10 to $40. These maps can be saved for play at a later date, or even while construction occurs.



The last new feature of Halo 3 is a video editor, allowing players to create recordings of their matches. It should be noted that rewinding is not supported.

Halo 3 takes advantage of the Xbox 360's graphics capabilities, and sports the usual assortment of effects including motion blur, HDR lighting and depth of field, however, a lack of anti-aliasing is painfully obvious. Outdoor textures for rocks and foliage also appear to be of a lower resolution, but one can hardly complain as the frame rate is always smooth.

As expected, Halo 3 is a solid upgrade to Halo 2. While the gameplay hasn't changed much, it's better in every conceivable way. Xbox 360 owners will be happy with their purchase, and if for some reason they're not, well... there's always Halo 4.



XBOX360

Developer **Microsoft**
Publisher **Bungie**
Website **www.halo3.com**

Players **N/A**
Other platforms **1-16 online, 1-4 co-op**

VERDICT

✓ **Pacing; multiplayer modes; special items; dual-wielding; video editor.**

✗ **Checkpoint system can be frustrating; annoying enemies.**

SCORE **9.0** OUT OF 10

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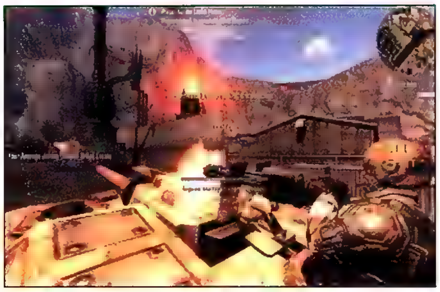


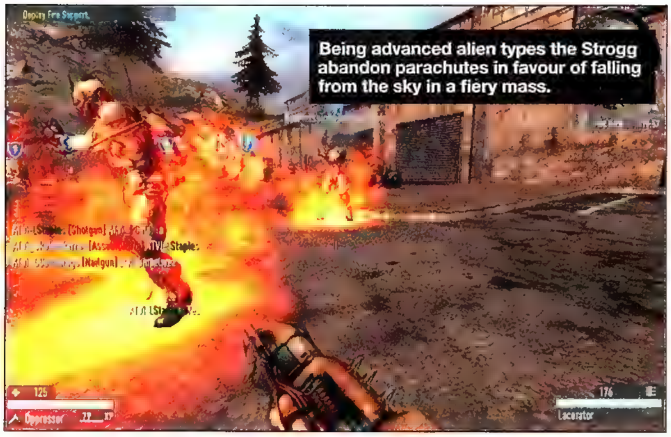
Enemy Territory: Quake Wars

James Matson finds gaming joy at the bottom of a bowl of Strogg.

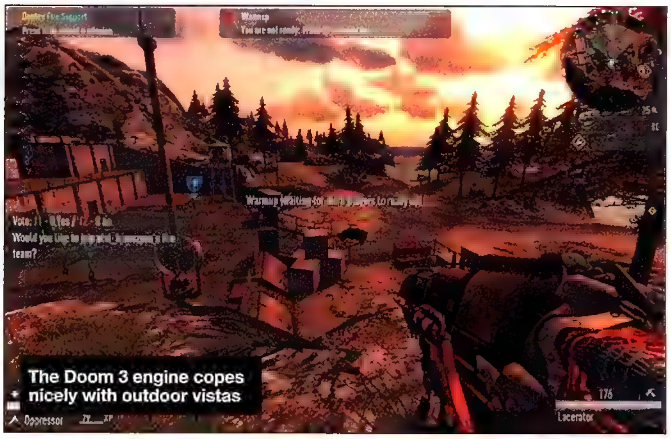
Injections of greatness are sparse in the FPS genre, but *Wolfenstein: Enemy Territory* was (and still is) a shining example of how a first person shooter can be done cleverly, and well. When developer Splash Damage announced it'd be taking the best bits of *Wolf ET* and splicing them into the *Quake* universe, everyone held their breath and waited. Now the wait is over, and what's been unleashed in the form of *Enemy Territory: Quake Wars* is majestic indeed.

The game centers on the invasion of Earth by the evil denizens of *Quake 2* fame, the 'Strogg'. These warmongers - having yet to learn the pros of horticulture and recycling - prefer to find worlds rich in life and bleed them dry. Earth's GDF (Global Defense Force) is mobilized into action forming the basis for a team FPS showdown. Insinuating *Quake Wars* is simply *Wolf ET* with a sci-fi setting would be a cheap shot to take, not because it's far off the mark, but because it belies the work gone into crafting a 12-map strategic shooter with enough individual flair to surpass rather than just emulate its predecessor.

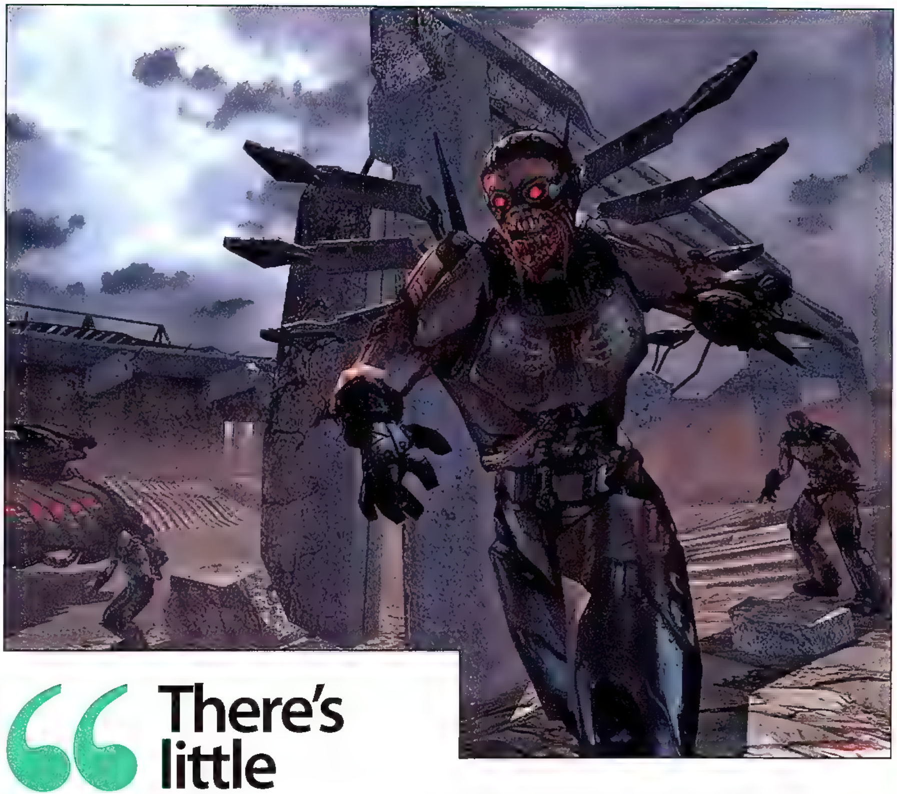
Like Wolf ET, maps are won by completing objective-driven missions, while the opposing team defends. Each objective requires the individual skills of one of five available classes (Covert Ops, Field Ops, Medic, Engineer and Soldier) while vehicles, deployable artillery and the ability to steal enemy identities all play an integral role. From time to time, secondary tasks are also flagged on your HUD when appropriate. Objective completion awards experience points to individuals who can unlock better weapons or physical abilities which are wiped after each match (in the case of campaign mode, after a



Being advanced alien types the Strogg abandon parachutes in favour of falling from the sky in a fiery mass.



The Doom 3 engine copes nicely with outdoor vistas



> "There's little incentive to choose the GDF suite of standard tanks, jeeps and rifles..."

three map stretch).

Visuals are driven by a modified *Doom 3* engine which now renders stunning outdoor areas with ease. With smooth framerates on even modest Geforce 6 or 7 series cards, *Quake Wars* spits out detail while asking for only modest PC specs. The only gripe is some maps suffer perpetual *'Doom 3'* darkness, sans available flashlight.

One of *Quake Wars* biggest attractions – factions which are unique beyond cosmetic differences – also presents its biggest flaw. Choosing GDF or Strogg results in a wildly different gaming experience, with the aliens coming out clear winners. It's not that the Strogg are more powerful; it's a question of the fun factor. There's little incentive to choose the GDF suite of standard tanks, jeeps and rifles, when you can suit up as the Strogg and take a 'Cyclops' mech-warrior onto the battlefield to wreak havoc. The Strogg Field Ops class can't drop ammo packs for teammates, but instead gets a personal shield that can be deployed to protect themselves or others. Strogg Medics procure energy for allies weapons *and* health by sucking it from the bodies of fallen foes, using similar techniques to create spawn points out of dead GDF soldiers; all this while the Strogg aren't busy flying around in jetpacks which the GDF don't have access to.

Despite this nagging flaw, Quake Wars is multiplayer elegance. Pretty to look at and backed up by a strong team emphasis and varied play styles. Loads of fun, whether you're launching super weapons from hilltops or dodging frontline firefights to escort allies, Quake Wars looks set to scoop up hordes of FPS fans into its maw. Just a shame we can't all be Strogg.

PC

Developer **Splash Damage/ID Software**
Publisher **Activision**
Website **enemyterritory.com**

Recommended
2.4GHz CPU; DirectX 9-complaint 3D card; 1GB RAM.

VERDICT

Team focus; smooth engine; fun classes; The Strogg ✓

Some murky maps; The GDF ✗

SCORE 9.0 OUT OF 10

www.thesettlers.com

Games for Windows

PG Mild violence

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CULTURESHOCK

Everything you need to know about geek film, music and literature.

Jesus Camp

DVD Distributor **Madman** Director **Heidi Ewing; Rachel Grady**
Starring **Becky Fischer; Mike Papantonio**

When it hit cinemas last year, *Jesus Camp* earned itself a helluva lot of publicity. Evangelical Christianity and the influence it supposedly has over the White House is a touchy issue in the States, apparently, so this movie - which mostly focuses on what goes on in Christian summer camps and 'megachurches' - was the subject of much praise and positive reviews.

Camp is certainly a well-made documentary, there's no denying that. And, as the hype has no doubt made you aware, it's more than occasionally unnerving. The part that freaked us out the most was when Becky Fischer, the pastor who runs the summer camp, explains that Muslim extremists in Palestine teach their kids how it's honourable to sacrifice one's life for God, so it's perfectly fine for Christians to impart similar lessons on their young. Unless you're a hardcore 'religion is evil, get rid of religion' atheist like Richard Dawkins, though, *Camp* probably won't terrify you as much as you expect it to. The hype hurts it. The movie has an agenda, that much is obvious from the trailer. Seeing as there is no narration, much of what the directors seem to want to get across comes through the comments of one of the central characters, Mike Papantonio, attorney and radio show host. So long as you're aware that it isn't unbiased journalism and can forget the hype, you should find it interesting. Unless the recent slew of 'religion is kinda scary' books has made you tired of the subject matter altogether. **CT**

score **7.0** OUT OF **10**

No Mercy for the Rude

DVD Distributor **Madman** Director **Cheol-hie Park**
Starring **Su-hee Go; Byeong-ok Kim**

No Mercy for the Rude is the sort of movie that'd no doubt appeal to fans of *Oldboy*, *Lady Vengeance* and *A Bittersweet Life* -it's dark, it's funny, it's violent, it's cool and it's a product of the new capital of film noir, South Korea. Indeed, fans of genre may recognise some of the cast from the afore-mentioned movies, particularly *Lady*.

Let's make one thing clear - *Mercy* is hardly the most original flick to come out in recent years. It's very much one of those 'hitman who has a heart of gold' stories. Our 'hero' is a mute contract killer with a love of seafood and bullfighting. His colleague is a ballet dancer who became a professional murderer after stuffing up his leg during a performance. Both have different motivations--the ex-dancer wants to set up a ballet school, while our hero wants to get a ridiculously expensive operation that'll fix his tongue. All is going well until he meets a fruity bar slut who decides that his speechlessness makes him much better than the average guy she takes home and falls in love with him.

In a move that will no doubt amuse fans of the genre, *Mercy* constantly makes fun of the impossible levels of coolness that characters in these movies often exhibit. It's not a pure comedy, though. Quirky as the cast is and frequent as the gags are, the story is serious and occasionally sad. The soundtrack, which bears a distinct Mexican flavour, is pretty neat too. **CT**

score **8.5** OUT OF **10**

ANIME OF THE MONTH

Your regular dose of anime goodness courtesy of our resident expert Armina Soemino.

Ghost in the Shell:
S.A.C. Solid State Society

Studio **Production I.G** Web **www.madman.com.au** Price **$34.95**

The Melancholy of Haruhi Suzimiya has everything you could possibly want – eccentricity, bright characters, great animation and gimmicks galore. The story centres on the normal, uninterested schoolboy, Kyon, who once dreamt of meeting aliens, time-travellers, and ESPers. Feeling that his imaginings would never come true, he decides to enter high school and live a normal, boring life. That is, until he meets a girl in class, Haruhi, who specifically only wants to meet al– Haruhi, the title character, is an element unto herself. She's twisted, unique, audacious, bossy and ultra hot. She also forms the 'Save our world by Overloading it with fun, Suzumiya Haruhi's Brigade' or SOS for short. Kyon is also a delight as the low-key narrator, whose cynicism is as humorous as it is satirical.

Not everyone will 'get' the series, but overall, if you like postmodernism and if you're anything but normal, then you'll love it.

score **8.0** OUT OF **10**

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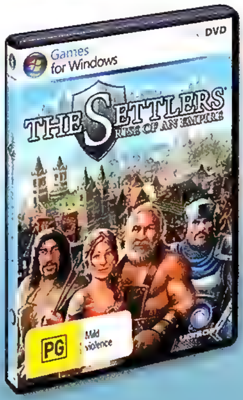

PG Mild violence

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BIGPOND GAMES

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GEEKETTE A girl's eye view of the gaming world.

Quality Assured

Kate Inabinet stops bugs dead, so you can move in the water with a jetpack.

Near the end of the project, when the meat and potatoes are in the pot for the development team, there is time to test and fix bugs. There are some who prefer to utilize this time by rating clips on YouTube or catching up on their Entourage episodes in a blissful haze of Quiet Apathy, while the rest of us like to be slightly more old fashioned and lend a hand in QA, without whom, the game would not load, would be missing at least one vital character and offer a selection of half transparent environments with more holes than a script from Numb3rs written on Swiss cheese.

> “It takes a rare breed of creature who can withstand this mind numbing monotony”

At first I found myself Quite Apprehensive at the thought of playing through the levels with any sense of responsibility, as my sheer lack of skills tends to attract a quick audience whenever I pick up a new game.

People are drawn to me like voyeurs at a grisly car wreck and I die a little inside each time I fail miserably at something a semi-precocious six year old is meant to be able to pick up within minutes. But, much to my delight, I soon discovered that my Quirkily Abysmal gameplay was actually considered an advantage in the world of QA. In fact, I finally felt like I had found my true calling.

My days flew by faster than Superman on crack as I got stuck under collision, fell through the world, and died in weird places only to be forever re-spawned in the air just to the left of the platform. I swanned about the office in a Queen-like Aura of smug as I recorded bug after bug, and I positively flushed with pride whenever I crashed the game. Never before have I been so proud of my mistakes.

Eventually my skills improved, but the price of this newly acquired leetness was that the days started to wear thin. I got to thanking the sweet lord that I didn't actually have to do this all day every day after all, and after pleading the merits of YouTube to the QA manager I was granted a Quick Absolution.

I discovered after only a relatively short period of time that not everyone is cut out for QA. It takes dedication and concentration to carefully record the exact time, place and circumstance of each problem so that you can retest a bug several times, make sure it is repeatable and thus diagnosable. Accurate reporting is not always returned to the exasperated coders trying to fix a bug recorded as "I stopped moving in the water"… what water? Where? What level of the damn game?

Testing for the large part is not actually playing (the game is not, in fact, playable – or at least fun for much of the development cycle) but instead consists of systematic fault testing, such as walking as far west as you can go, then sliding your character against the mountains until you reach the north end of the map, just to make sure you don't fall out of the world. Then do it while jumping… oh you added a new double jump this week? So all the levels again then… double jumping… a jet pack you say? I need something sharp to cut myself with.

It takes a rare breed of creature who can withstand this mind numbing monotony and the best find sport in it with tricks such as "I bet I can find a gap in the collision today, my record is 2mins and 6seconds"! The talented ones are those that contrive to investigate the most bizarre and unlikely circumstances to render a fault visible. These individuals do exceptional work and often enjoy QA more than anyone else from the moment they arrive on the blue bus in the morning, to the moment they clock off each evening.

I sleep well at night, safe in the knowledge that my quasi altruism helped in its small way to get the game out the door, but of course the real merit lies with the full time QA testers: Those Quiet Achievers who selflessly plug away at a thankless task, while everyone else moans about how great it would be to be able to play games all day and get paid for it.

Kate jet-packs off through the debugged water, head held high in Quirky Absolution.
geekette@atomicmpc.com.au

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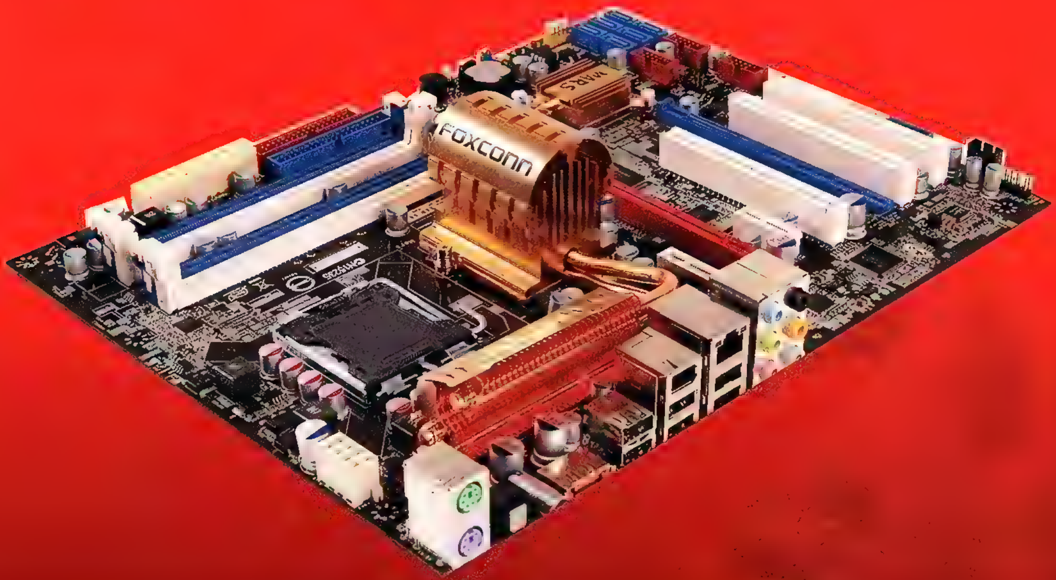

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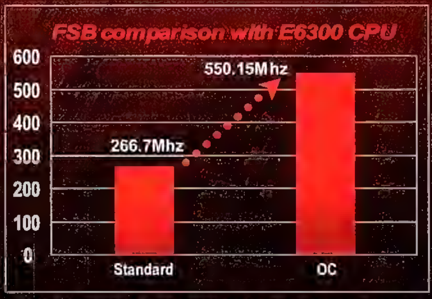

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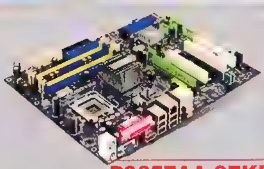

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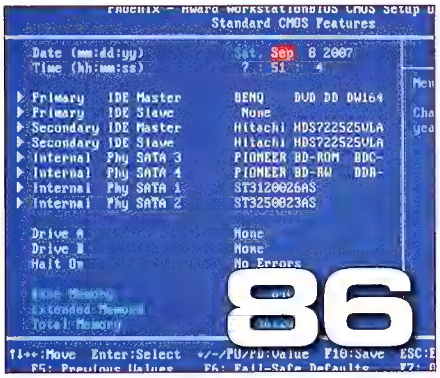
TOMORROW'S TECHNOLOGIES – TODAY

TECHNIQUE

HANDS-ON TUTORIALS FOR THE TECHNICALLY INCLINED

Can you imagine a greater sense of satisfaction than playing classic games on a MAME cabinet, that you built yourself? Hell no! Getting gritty with steel, wood, paint and electrics is the stuff that defines us, and makes us better than the bunny rabbits and deer. Don't spend your life thinking you'll build a MAME box one day – do it *now!*

But sure, that's a lot of hard work and not many of could be arsed. So we've given you a BIOS tute this month if all you really want to 'build' is a bit of tweaking you can do while sitting down, that won't take more than an hour of fiddling. The results are worth it. You'd be surprised what good things come from twiddling strangely named obscurities in the Blue Room.



```
Phoenix - Award WorkstationBIOS CMOS Setup U
                    Standard CMOS Features

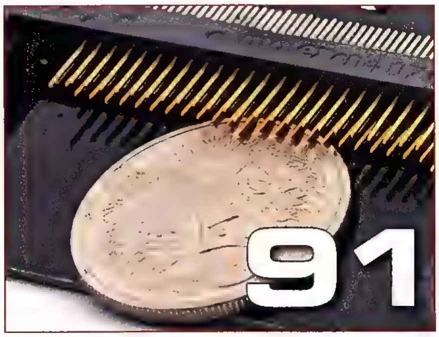
  Date (mm:dd:yy)                 Sat, Sep  8 2007
  Time (hh:mm:ss)                  7 : 51 : 4

▶ Primary   IDE Master            BENQ    DVD DD DW164
▶ Primary   IDE Slave              None
▶ Secondary IDE Master            Hitachi HDS722525VLA
▶ Secondary IDE Slave             Hitachi HDS722525VLA
▶ Internal  Phy SATA 3            PIONEER BD-ROM  BDC-
▶ Internal  Phy SATA 4            PIONEER BD-RW   BDR-
▶ Internal  Phy SATA 1            ST3120026AS
▶ Internal  Phy SATA 2            ST3250823AS

  Drive A                         None
  Drive B                         None
  Halt On                         No Errors

  Base Memory
  Extended Memory
  Total Memory

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:E
  F5: Previous Values      F6: Fail-Safe Defaults    F7: O
```



TECHNIQUE CONTENTS

MAME box tutorial, pt1 82
Captain Ron leads you through his dirtty old garage and into his toolbox. This month, we embark on a magical journey of steel, particle board, and every single cool arcade and retro console game ever created!

BIOS tweaking 86
Jake Carroll spends more time mucking around in BIOS than he does actually using his PC for stuff. We tap into his brain and share with you the free speed boosts to be had with Jake's secret knowledge.

Input Ouput 91
Dan Rutter eats PC malfunctions for breakfast, with sugar. Read with joy the suffering of complete strangers, and be amazed that Dan cares!

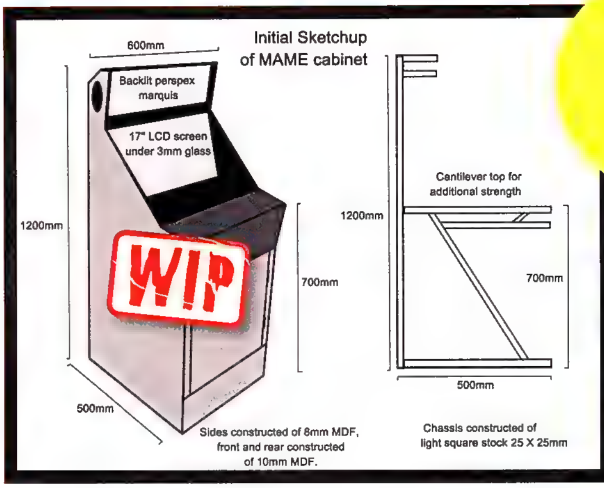
Fallout 98
Logan trips out with Halo 3, shifting his brain into a state of colour cycling red and blue.

THE TERRIFYING NATIONALLY BESTSELLING SERIES
30 DAYS OF NIGHT™
IMMORTAL REMAINS

30 Days of Nights
5 x 1st prizes: Signed poster by creator Ben Templesmith, the book, and a movie double pass.
20 x runner up prizes: movie double passes.
www.atomicmpc.com.au/competitions

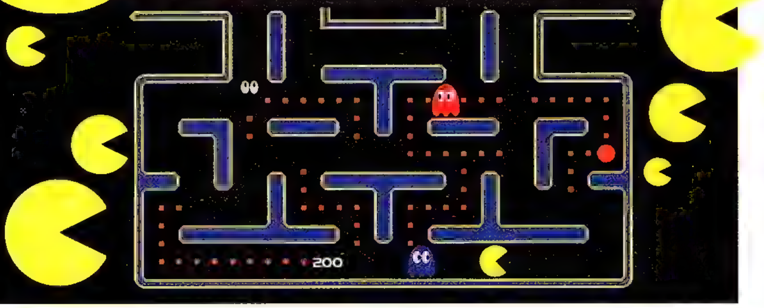
Adapted from the break out comic book series, 30 Days of Night set in Barrow Alaska, the northernmost town in the United States where the sun sets for thirty consecutive days during winter. Unseen predators cut off all means of communication and a small band of people who survive the initial onslaught are led by a young sheriff couple, Eben and Stella, in their fight to stay alive until the return of daylight…

Movie release: 8 November, 2007


Initial Sketchup
of MAME cabinet
600mm
Backlit perspex marquis
17" LCD screen under 3mm glass
1200mm
700mm
500mm
WIP
Sides constructed of 8mm MDF, front and rear constructed of 10mm MDF.
Cantilever top for additional strength
1200mm
700mm
500mm
Chassis constructed of light square stock 25 X 25mm

THE MISSION

Construct a PC case that resembles a classic arcade machine, and then install MAME onto its drive for some old-school gaming goodness. This is part one of a three-part tutorial.



DIFFICULTY **HARD**

Made for Arcade, part 1

Ron Prouse makes a start on his home-made MAME arcade machine.

TOOLS

The tools used in this tutorial are mainly those found in the average workshop, including a MIG welder, circular saw, jigsaw, mitre box, drill press and drills, block plane, sander, G-clamps and a grinder. The important thing is to keep the structure 'square' and 'level', so a set-square, sliding bezel and a tape measure are critical items to get all of the angles perfectly symmetrical. The main requirement is a decent bench or table, providing a solid, flat surface to operate on.

Depending on your age, the word MAME either evokes thoughts of a dodgy 1974 movie starring Lucile Ball, or a cool game emulator. If we focus on the later, Wikipedia describes MAME as 'an emulator application designed to recreate the hardware of arcade game systems in software, with the intent of preserving gaming history and preventing vintage games from being lost or forgotten. The name is an acronym for Multiple Arcade Machine Emulator.'

Wikipedia goes on to say, 'MAME contains several components: a central processing unit (CPU) emulator which duplicates the behavior of the CPUs of many original arcade machines; an input emulator which maps arcade buttons, joysticks, and other controls to PC keyboards, joysticks and other devices; and an emulator for the arcade game display and sound equipment.'

This is all good, but what Wikipedia fails to mention is that all of that hardware and software needs to be housed in some sort of a box – preferably something that looks suitable for the undertaking.

The first task, as always, is to draw up some plans of the project, however we must admit upfront that this design was to end up being extremely dynamic as the mission unfolded. The basics remained the same, however, using a steel chassis clad with MDF sheeting. The concept was to use the classic upright cabinet shape, but to downsize it into a sit-down unit that would take up less space.

STEP 1 Cold steel

A MIG welder is less likely to burn holes in this guage steel.

Our other confession is that the metal chassis is not all of our own doing. While BBQ shopping at Kmart, I wandered though the area where they sell cheap computer desks, and noticed that the 'Phoenix Computer Desk' (#39706997) had the same basic design as my initial schematic – and it was on special for $36! After doing a quick mental calculation of how much this quantity of light gauge 25 x 25mm steel would be likely to cost – plus the four castor wheels that were included – I decided that this was a good place to start.

The first step was to 'cut and shut' the sections that I wanted to use, and then re-weld all of the joints and bolt together sections for added strength. This task was performed with a MIG welder, as it gives good weld penetration and is less likely to burn holes in the thin metal. All of the welds were then finished off using a 100mm grinder, making them flush where the MDF would make contact with the frame, and then given a quick coat of paint to avoid rust.

STEP 2 Structural preparation

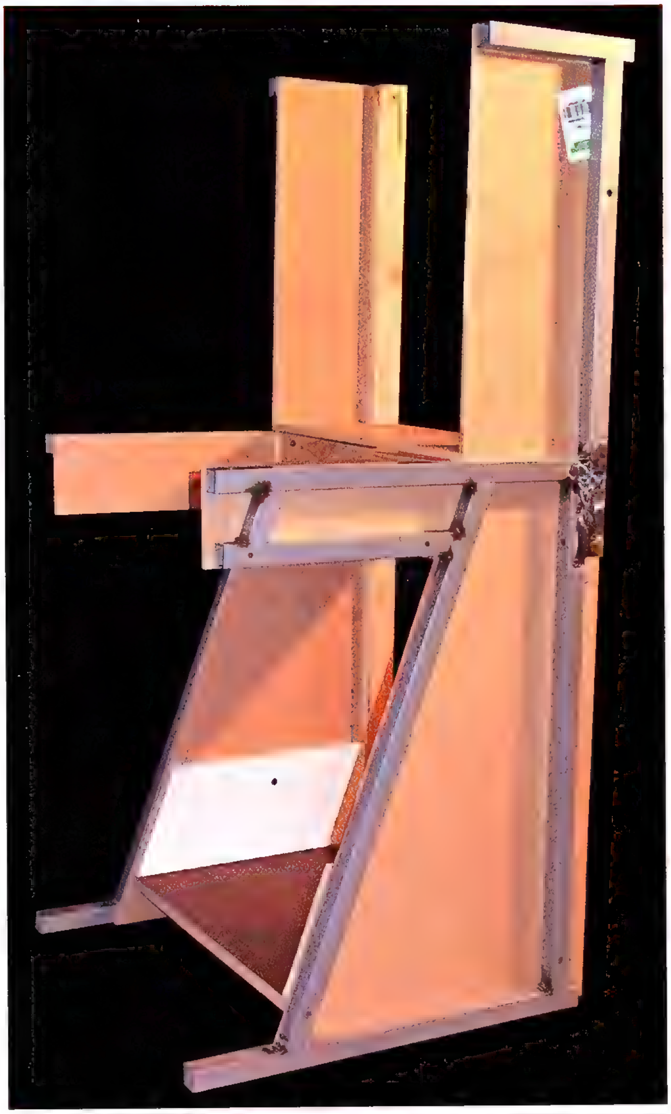
With the chassis complete, the next step was to cut out an inner skin of 9mm MDF sheet, which will become the mounting point for all of the internal components and covers. Two additional 42 x 19mm wooden uprights were added to the rear of the structure, mainly to give additional rigidity to the upper section of the cabinet, but also recessed 12mm to provide a mounting surface for the rear-cover section. The inner sections were fixed to the chassis with countersunk self-tapping screws and a liberal amount of Fuller's Max Bond - a structural building adhesive that will stick to nearly every solid substance known to man. Again, this helps with rigidity of the frame, and keeps all of the sections firmly bound together.

A point worth making is that all of the components were planed and sanded to a paintable finish prior to assembly – it takes more time initially, but it is easier to use an electric sander on flat surfaces than it is in tight corners and boxed-in sections.

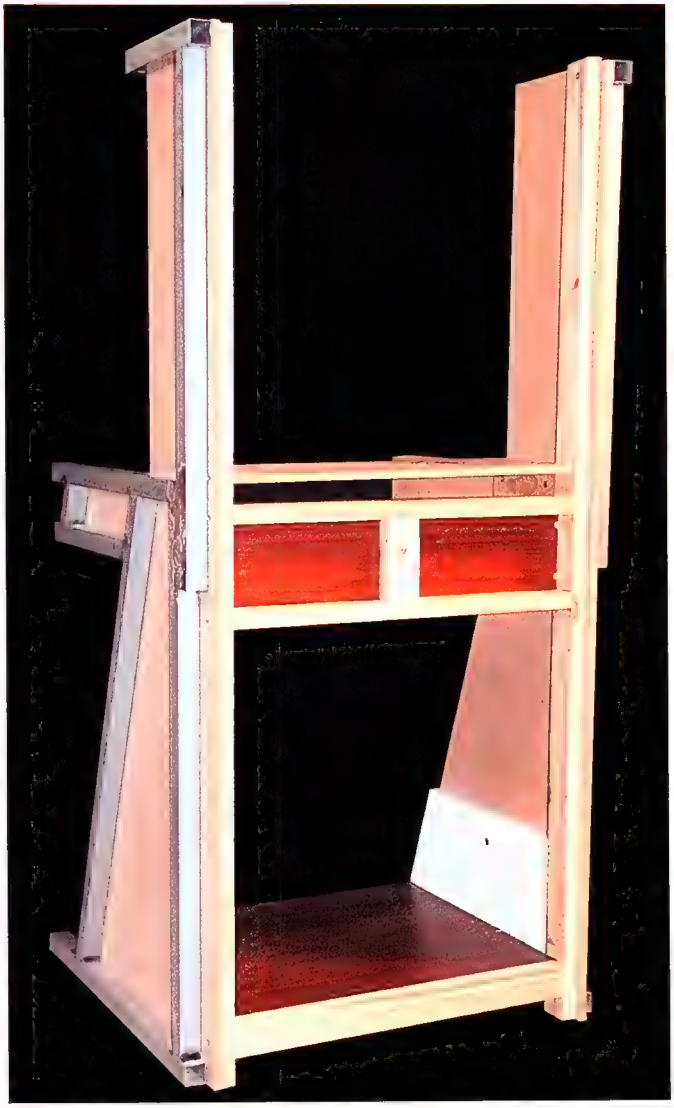
STEP 3 Structural strength

The real strength of the base unit comes from the centre H-section that joins the two steel chassis components together, and the lower floor section. It is crucial that all of the joints are perfectly square, and positioned correctly, or the rest of the structure will be misaligned. A millimetre or two might not seem like much, but the knock-on ramifications will be really obvious in the final product.

The centre bracket was fabricated from 42 x 19mm pine studs, which were glued and then screwed in through the steel frame with countersunk wood screws. The dark brown sections of 14mm timber were parts of the original desk structure, cut so that they could be reused, with an additional 42 x 19mm



▲ **The steel chassis and MDF skin will form the basis of a very solid structure.**



▲ **Timber cross-supports tie the two sides together and keep components square.**

brace fitted across the rear floor section. The white sections are melamine-covered MDF panels that will be used later to secure the modified computer case into position. Although it's not shown here, a 6mm-thick MDF top panel was also added, to keep the upper section of the structure secured into its correct position.

STEP 4 Screen position

Of all of the components, the positioning of the screen is the most critical, especially if you are using an LCD. With tighter viewing angles than a CRT, LCDs are best viewed from directly in front, so it is important that the angle of the screen is kept relative to the position of a 'notional' players head. After some testing with a live screen, the desired angle was determined and two sections of 42 x 19mm timber positioned at the front edge of the screen sides, plus 5mm to allow for the screen masking panel. The IBM 17" #AB-1 that we are using was chosen as the base can be stripped down to a solid metal bracket that can be screwed down to the 16mm cabinet shelf. The 5mm-thick MDF panel for the screen mask was then cut to shape, with the upper edge chamfered so that it locks in securely, and the hole for the screen cut out using a jigsaw.

How did we get the hole in the right spot? With the LCD in its correct position, the extremities of the actual screen (not the bezel) area were extended out and marked on to the surrounding framework. With the screen mask back in place, the lines were then drawn in using these marks and a metre ruler. Simple always works best! Following on from that, the easiest method for achieving the tightly rounded corners is to use a 6mm drill bit in each corner first, and then cut the straight sides in at a 90° tangent. While you have the 6mm drill in your hand, don't forget to drill a pilot hole for the jigsaw in each of the four sides of the cut-out.

Once cut, the edges of the hole were sanded over in an arc to give a softer profile that imitated the plastic bezel on the screen. Finally, 10mm-wide x 3mm-thick self-adhesive grey foam was attached to the front facia of the screen to take pressure off of the OSD buttons, and to block off any small gaps between the bezel and the mask.

STEP 5 PC assembly

Lian Li lovers will shed a tear at this point. Although this would have been a perfect application for a Lian Li PC-C32A rack mount, we didn't have one, so we decided to fabricate our own.

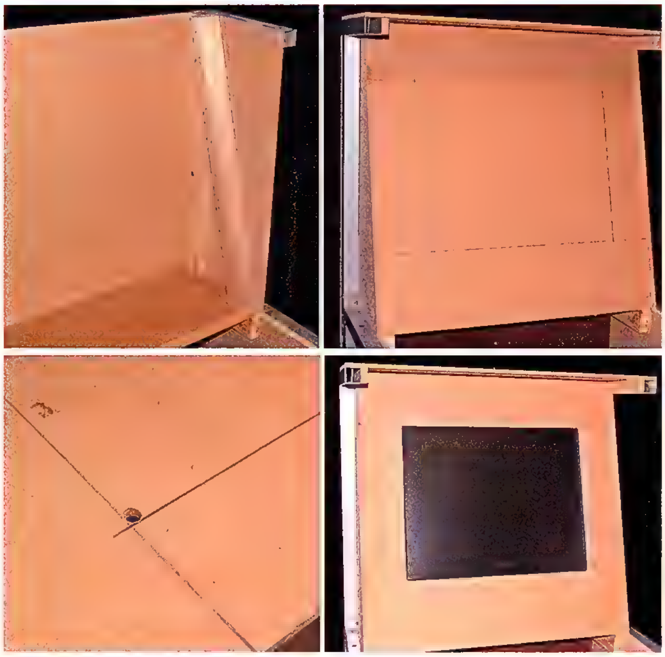
The construction brief is simple. Take a Lian Li PC-60, strip it right down to a bare frame, and then cut off everything that you don't need, using a 100mm grinder with a 1mm thick cutting wheel. The case was cut so that it conformed to the L-shape of the front of the cabinet, making sure to leave the removable mobo tray intact – the resultant ease of PC access for later (and the sturdy construction) was the main reason that we chose a Lian Li enclosure in the first place.

Once cut, the case was re-fabricated for strength using 25 x 12mm rectangular section and 25 x 25mm angle aluminium stock, riveted into place with 1/8" steel rivets. A 25 x 12mm cross-member was added, and the original 3.5" cage was cut to hold one drive and inverted so that it held the single hard drive above the motherboard. The boxed-in section in front of the power supply is actually the cut-down bottom of the original 5.25" bay cage. All of the sharp edges were smoothed over with a file and fine sandpaper, and nylon edging used in the more accessible areas. The final touch will be a silver AC Ryan MeshX panel over the top for protection - when it arrives!

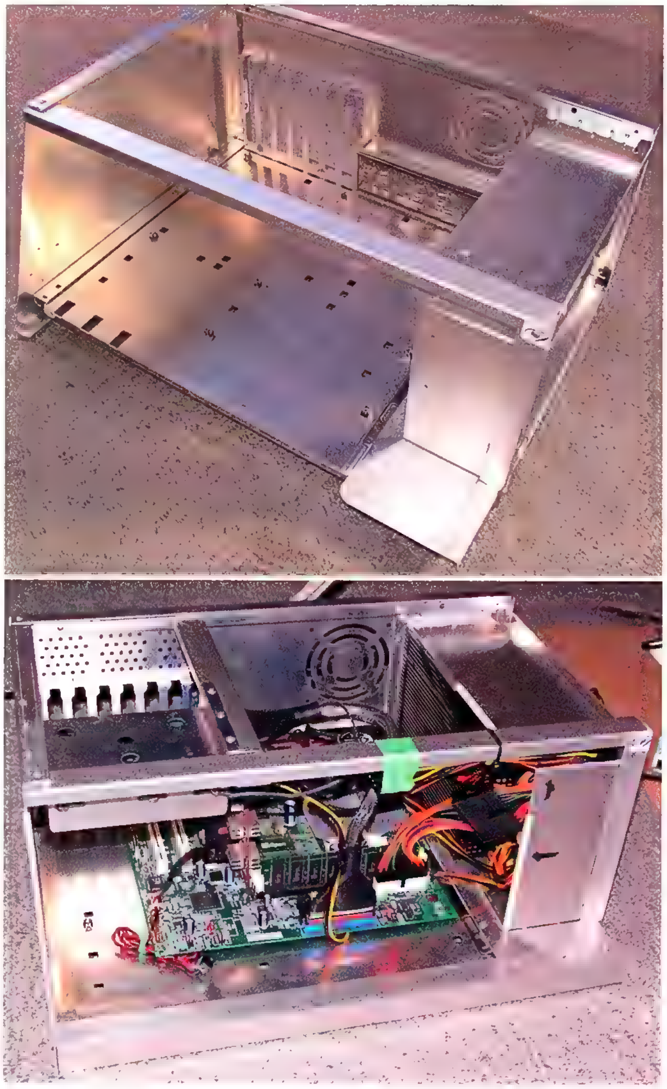
STEP 6 Mechanisms

As we had thrown away the plans at about Step 4, it was time to test-fit the PC components, to make sure that everything fitted correctly in the structure so far, and to check that there wouldn't be any surprise issues when it came to fitting the body panels, wiring and other apparatus. As an example, the plan is to have all of the emulation hardware attached to a slide-out shelf above the PC case, while leaving as much ventilation space as possible, so getting some physical measurements at this point helped to determine the position of everything else moving forward.

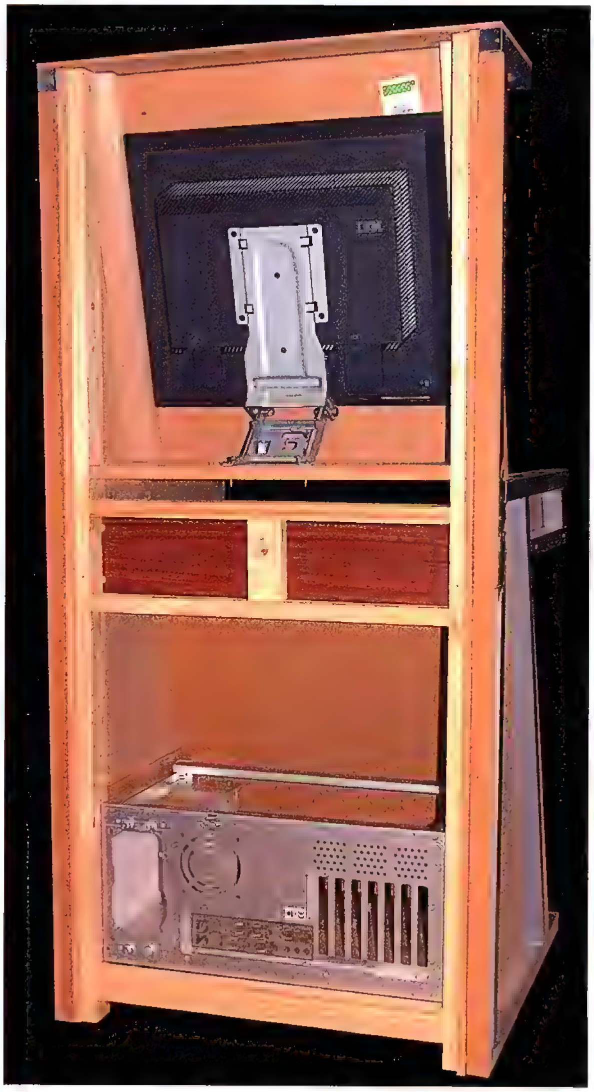
For aesthetic reasons, the idea is to completely obscure the metal chassis from view, so 25mm-wide strips of 16mm MDF were cut, glued and nailed into place down each side of the cabinet. These strips will also provide solid structural points to attach the 18mm-thick MDF 'outer skin' when the final assembly takes place. Additionally, two spring-loaded horizontal struts will be used to hold the screen firmly in position, and the PC case will be screwed down onto the floor.



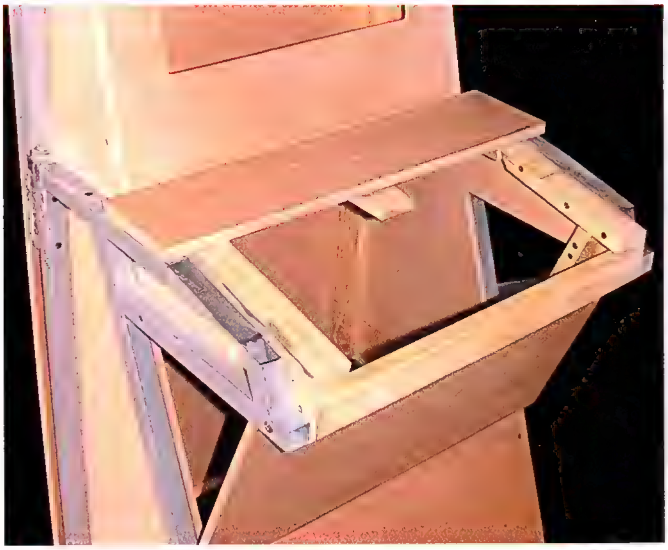
Getting the position of the screen right is critical.



The aluminium goodness of Lian Li - what can't it do?



Components installed for the first time.



The panel is over-engineered to take substantial abuse.

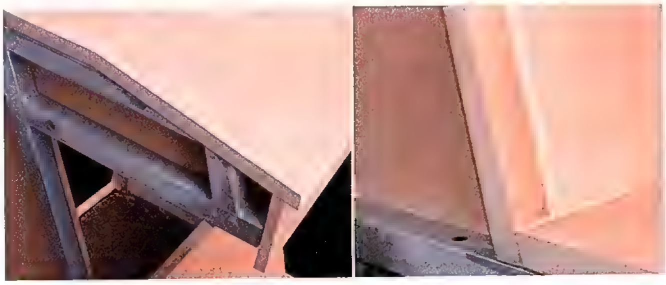
STEP 7 Control panel

With regard to dynamically changing plans, the whole control panel area was about to cop a re-think. Initially, the concept was to have a horizontally flat panel to house the joystick and buttons, but after reviewing the ergonomics we decided to conform to the common practice of tilting it down at 15-20°. This meant cutting a 200mm section of the front of the chassis and inner skin down on an angle, to remove 25mm of height at the thick end of the 'wedge'. As well as an existing 19mm metal brace, an additional 42 x 19mm cross brace was added to the front of the chassis for rigidity, and three control panel support sections were glued and screwed in, one at each side and also at the centre-top of the opening. After chamfering for a snug fit, the 120mm-wide x 16mm MDF upper panel was glued and screwed into position.

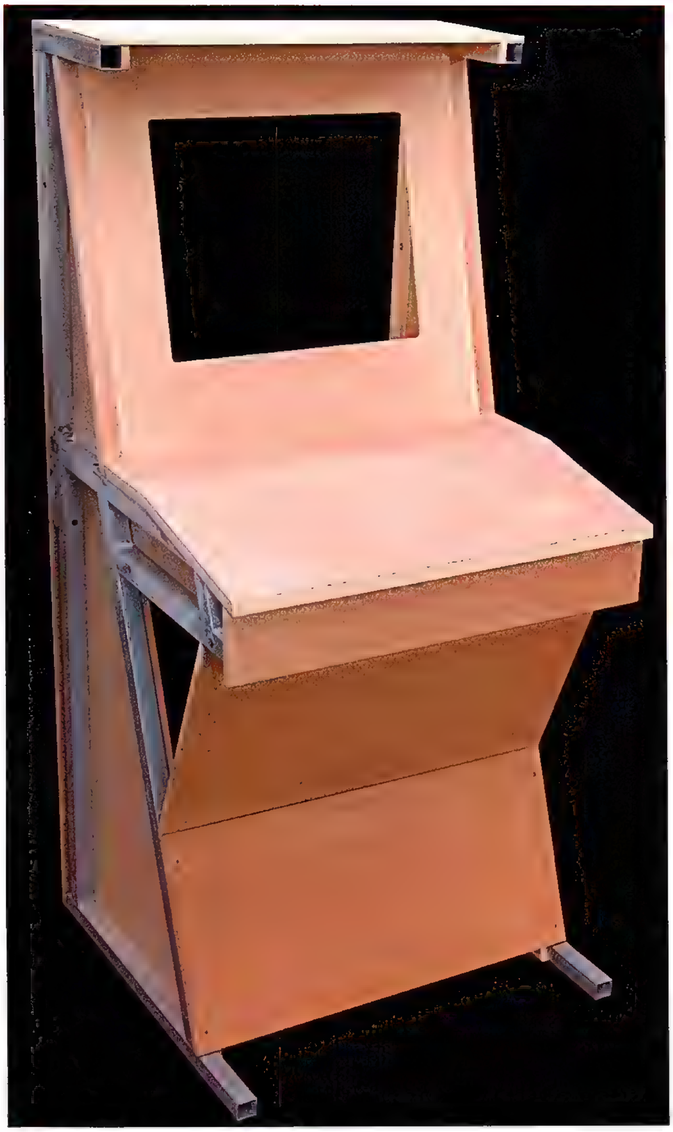
The lower front of the cabinet was also the subject of a redesign. Initially the front was going to be square, but as a sit-down unit there wasn't any room for the player's legs. The next idea was to have the front sloping at the same angle as the chassis, which was good for legroom, but looked 'all wrong'. The other issue was that now that the control panel was on an angle it became obvious that there wouldn't really be enough room for the joystick and control button mechanisms. A quick chat to Chris Wigg at OzStick determined that at least 70mm of inside clearance was required, and we were down to less than 65mm. The final answer was a 270mm lower sloping section to provide legroom, and a 320mm squared off upper section to allow ample room under the control panel.

Detailing

Without wanting to turn this into too much of a woodworking tutorial, there are a few things that really need to be mentioned regarding getting the best possible finish for your MAME cabinet. Just like case painting, 80 percent of the outcome is reflected in the preparation and care that you take along the way. Ignore the small detail now, and you will end up with something that looks like an old packing crate with a screen!



Attention to detail is the only way to ensure great results.



The end always justifies the means.

The second is getting all of the joints to fit as snugly as possible. Using care when cutting is a start, but all mating surfaces need to be planed and lightly sanded to gain maximum contact area. This will give the most effective and strong bonds when using glue, and result in the finished cabinet looking 'factory-made'. Last, but not least, the purchase of some specific woodworking tools such as a mitre saw, block plane and a sliding bezel, will make life easier and save time when it comes to measuring and cutting obscure angles.

1/3rd there!

So, at the end of part 1 the MAME cabinet looks quite different than our original plans envisioned, but the evolution has been driven by both need and aesthetics. All of the inner panels are now fitted, ready for final filling and fine sanding. Part 2 of this tutorial will cover painting, 240V wiring, final fitting of the PC components and fabrication of the control panel.

SUPPLIES

OzStick: www.ozstick.com.au
Advice from Chris has been invaluable so far, and in part 2 we will start using some of the OzStick stock in trade – arcade controllers, emulators and buttons.

DIFFICULTY INTERMEDIATE ●●○○

Polishing the blue room

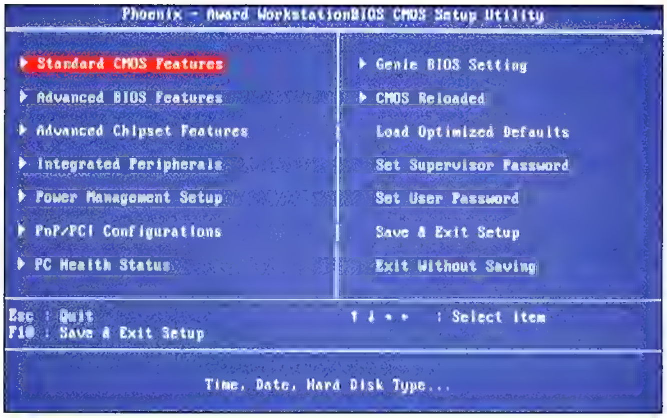
Essential BIOS know-how and tweakage with **Jake Carroll**.

About 25 years ago, man met BIOS- the Basic Input Output System. An invention of IBM's research labs, it was construed as an intermediary layer between the OS and the bare metal of a computer.

This month, we BIOS tweak, helping you fine tune your system to a state of humming perfection.

The CMOS standards

You probably already know how to push up your front side bus and add voltage to your VCore, but to really squeeze the life out of your rig, this just isn't enough. Do you really know your CAS from your RAS, or Precharge TCD? Most motherboards will likely contain a Phoenix Award or an American Megatrends based BIOS. It makes no difference, apart from occasional structural variations in menus.



```
            Phoenix - Award WorkstationBIOS CMOS Setup Utility

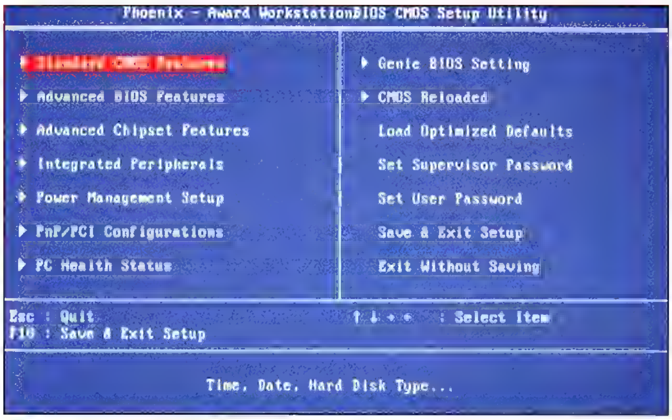
 ▶ Standard CMOS Features           ▶ Genie BIOS Setting
 ▶ Advanced BIOS Features           ▶ CMOS Reloaded
 ▶ Advanced Chipset Features          Load Optimized Defaults
 ▶ Integrated Peripherals             Set Supervisor Password
 ▶ Power Management Setup             Set User Password
 ▶ PnP/PCI Configurations             Save & Exit Setup
 ▶ PC Health Status                   Exit Without Saving

Esc : Quit                           ↑ ↓ → ←   : Select Item
F10 : Save & Exit Setup

                      Time, Date, Hard Disk Type...
```

Figure 1 - The base BIOS config screen. Pay careful attention on Gigabyte motherboards here. Ctrl + F1 keys will open Gigabyte's 'expert' modes. Other manufacturers such as ABIT and ASUS don't generally hide their advanced options.

Note our careful use of the Halt on No Errors option (shown in **Figure 2**). Using this option will essentially prevent any keyboard or external non-compliant peripherals from preventing full POST.



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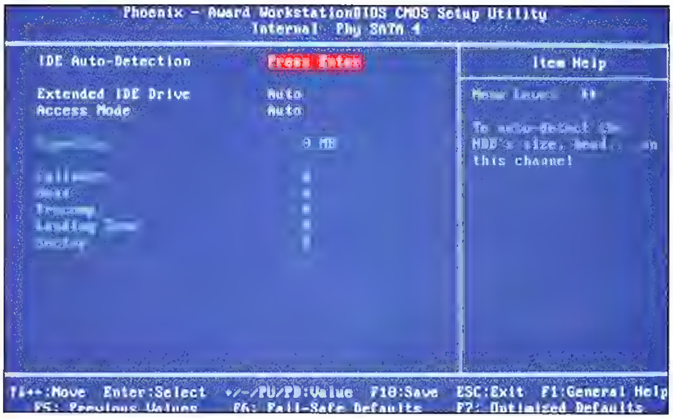
            Phoenix - Award WorkstationBIOS CMOS Setup Utility

 ▶ Standard CMOS Features           ▶ Genie BIOS Setting
 ▶ Advanced BIOS Features           ▶ CMOS Reloaded
 ▶ Advanced Chipset Features          Load Optimized Defaults
 ▶ Integrated Peripherals             Set Supervisor Password
 ▶ Power Management Setup             Set User Password
 ▶ PnP/PCI Configurations             Save & Exit Setup
 ▶ PC Health Status                   Exit Without Saving

Esc : Quit                           ↑ ↓ → ←   : Select Item
F10 : Save & Exit Setup

                      Time, Date, Hard Disk Type...
```

Figure 2 - Drive channels, CMOS functions



```
            Phoenix - Award WorkstationBIOS CMOS Setup Utility
                          Internal  Phy SATA 4

  IDE Auto-Detection            [Press Enter]  |        Item Help
                                               |
  Extended IDE Drive             Auto          |  [illegible]
  Access Mode                    Auto          |
                                               |  To auto-detect the
  [illegible]                      0 MB        |  HDD's size, head... on
                                               |  this channel
  [illegible]

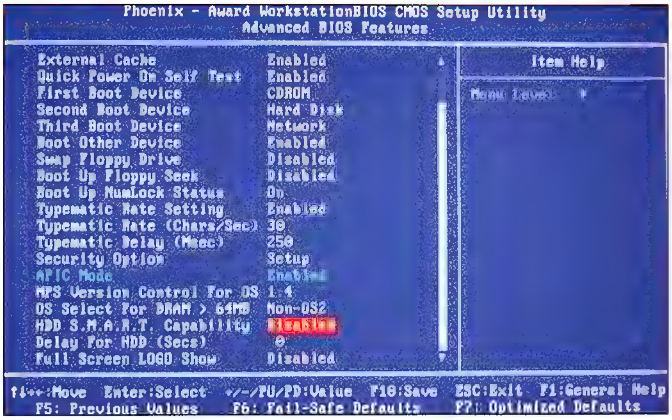
↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5: Previous Values     F6: Fail-Safe Defaults    F7: Optimized Defaults
```

Figure 3 - IDE transfer mode detection. In here, the end user can set LBA capping, transfer modes and even drive geometry should they require it

'Make storage go fast' button

Selecting any of the devices within **Figure 2** allows you to tune the parameters of the Logical Block Addressing (LBA) devices. An important part of this is making sure you lock the channel modes to Direct Memory Access (DMA) where appropriate, to prevent automatic defaulting to Paged Input/output (PIO). This is critical for general system stability and performance, as defaulting to PIO mode will result in paged operations consuming large amounts of system resources from logical block devices. See **Figure 3**.

We need to give our hard disks room to move and breathe. Many people bemoan and disrespect the S.M.A.R.T. system for its inability to accurately



```
              Phoenix - Award WorkstationBIOS CMOS Setup Utility
                           Advanced BIOS Features

  External Cache               Enabled                  Item Help
  Quick Power On Self Test     Enabled
  First Boot Device            CDROM               Menu Level   ▶
  Second Boot Device           Hard Disk
  Third Boot Device            Network
  Boot Other Device            Enabled
  Swap Floppy Drive            Disabled
  Boot Up Floppy Seek          Disabled
  Boot Up NumLock Status       On
  Typematic Rate Setting       Enabled
  Typematic Rate (Chars/Sec)   30
  Typematic Delay (Msec)       250
  Security Option              Setup
  APIC Mode                    Enabled
  MPS Version Control For OS   1.4
  OS Select For DRAM > 64MB    Non-OS2
  HDD S.M.A.R.T. Capability    Disabled
  Delay For HDD (Secs)          0
  Full Screen LOGO Show        Disabled

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
  F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

Figure 4 – Disabling SMART and adding a HDD Delay spinup can be useful for high performance/high reliability environments

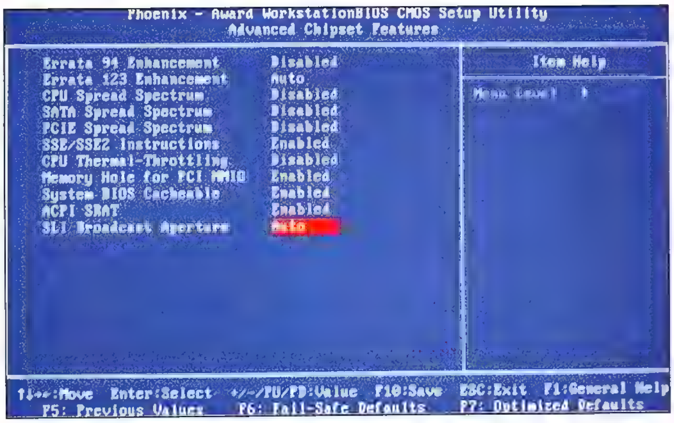
predict when a critical disk or controller failure will occur. It has other problems. Disabling S.M.A.R.T. can, in certain circumstances, actually increase I/O on standard, mirrored and striped volumes. Turn it off and do some HDTach benchmarking. You might be surprised. A step ahead again, if you set a delay time for HDD spinup (delay for HDD), you may be able to achieve things in RAID array connected configurations that you couldn't before.

An example of this is if your workstation directly connects via FireWire 800/eSATA or some other high throughput interface to an external RAID array. Typically with such hardware, in the event of a power failure the array's controller and backplane can take up to several minutes to reinitialise. Having your system boot before array/controller in it can be a dangerous, volatile situation. High end and workstation users will appreciate this.

Input/output and throughput

If you've ever wondered why your CPU never reported as it should in CPU-Z or WinCPUID, or things never seemed to come out at the right FSB/clock when calculating your overclocks via multiplier, a possible reason can be found in spectrum spreading.

Spread Spectrum is a mitigation mechanism for electromagnetic interference (EMI). Power cycling through components at 50/60Hz has sinusoidal waves with 'peaks' and 'troughs' which can cause interference with other devices, including audio cards, external interfaces and even telephones. Enabling the spread spectrum 'dampens' or attempts to flatten these peaks and troughs, thus creating less electronic noise. This is at a detriment to your systems overall performance as it has the ability to modify core clock PL. Disable it. Blast power though your components. Don't consider others.

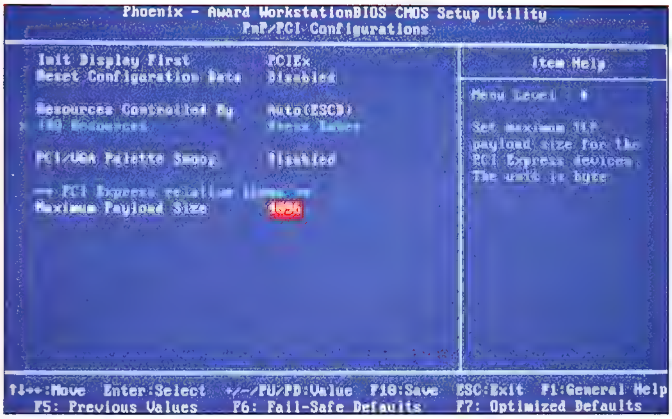


```
              Phoenix - Award WorkstationBIOS CMOS Setup Utility
                         Advanced Chipset Features

  Errata 94 Enhancement        Disabled                 Item Help
  Errata 123 Enhancement       Auto
  CPU Spread Spectrum          Disabled            Menu Level   ▶
  SATA Spread Spectrum         Disabled
  PCIE Spread Spectrum         Disabled
  SSE/SSE2 Instructions        Enabled
  CPU Thermal-Throttling       Disabled
  Memory Hole for PCI MMIO     Enabled
  System BIOS Cacheable        Enabled
  ACPI SRAT                    Enabled
  SLI Broadcast Aperture       Auto

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
  F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

Figure 5 - Spectrum mapping options



```
              Phoenix - Award WorkstationBIOS CMOS Setup Utility
                          PnP/PCI Configurations

  Init Display First           PCIEx                    Item Help
  Reset Configuration Data     Disabled
                                                   Menu Level   ▶
  Resources Controlled By      Auto(ESCD)
x IRQ Resources                Press Enter         Set maximum TLP
                                                   payload size for the
  PCI/VGA Palette Snoop        Disabled            PCI Express devices.
                                                   The unit is byte
  ** PCI Express relative items **
  Maximum Payload Size         4096

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
  F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

Figure 6 - PCI-E link configuration

Holy RAM

64bit desktop computing architectures have created problems for legacy operating systems. Memory Hole for PCI MMIO flags are useful here. Using 32bit operating systems in combination with certain memory controllers will only allow the OS to gain access to 3.2xGB of RAM. Memory hole remapping allows a user to access a full in-page 4GB of RAM (4096MB, commonly) from both a 32bit OS and a 64bit OS. The most common case is Windows XP 32bit, running on current Nforce4/5/6 and Core2Duo Intel P series chipsets with 4GB of RAM. Memory remapping should have you running unconstrained quick smart!

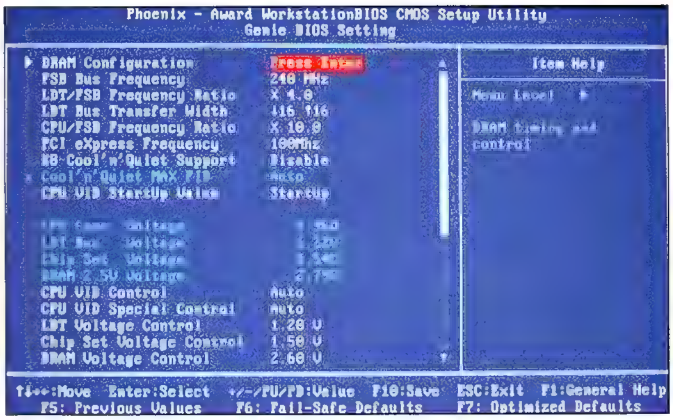
Video card vamping

In a multi monitor world, we oftentimes run strange configurations of PCI-E and PCI. For those who are in such a situation, PCI video card initialisation can be problematic at times. A method to force the correct startup card is using the 'Init display first' flag. We opt for PCI-E.

PCI-E Payload

For the harder tweakers, the Maximum Payload Size can be altered on many high end motherboards. It is important to realise that this isn't the same as the good old AGP-Aperture. This new setting relates to transfer bandwidth in both directions for the PCI-E link. Standard PCI-E 1x has a maximum bandwidth of 2.5Gb/sec. Accordingly, 16x PCI-E has a bandwidth of 40Gb/sec. We don't recommend changing the default value of 4096 in most common BIOS configurations, unless you have very specific PCI-E hardware supporting link speeds greater than 40Gb/sec (yes, they do exist!). This doesn't take into account PCI-E v2.0 or v3.0.

PCI-E Bus frequency



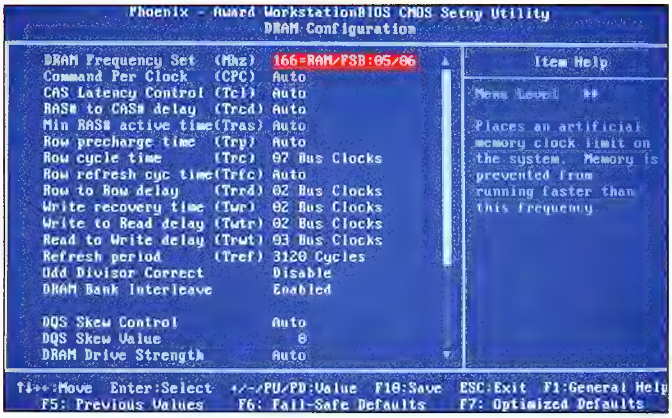
```
              Phoenix - Award WorkstationBIOS CMOS Setup Utility
                            Genie BIOS Setting

▶ DRAM Configuration           Press Enter              Item Help
  FSB Bus Frequency            240 MHz
  LDT/FSB Frequency Ratio      X 4.0               Menu Level   ▶
  LDT Bus Transfer Width       ↓16 ↑16
  CPU/FSB Frequency Ratio      X 10.0              DRAM timing and
  PCI eXpress Frequency        100Mhz              control
  K8 Cool'n'Quiet Support      Disable
x Cool'n'Quiet MAX FID         Auto
  CPU VID StartUp Value        StartUp

  CPU Core Voltage                 [illegible]
  LDT Bus Voltage                  [illegible]
  Chip Set Voltage                 [illegible]
  DRAM 2.5V Voltage                [illegible]
  CPU VID Control              Auto
  CPU VID Special Control      Auto
  LDT Voltage Control          1.20 V
  Chip Set Voltage Control     1.50 V
  DRAM Voltage Control         2.60 V

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
  F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

Figure 7 – Global clocking settings



```
            Phoenix - Award WorkstationBIOS CMOS Setup Utility
                           DRAM Configuration

  DRAM Frequency Set   (Mhz)  166=RAM/FSB:05/06     Item Help
  Command Per Clock    (CPC)  Auto
  CAS Latency Control  (Tcl)  Auto                Menu Level   ▶▶
  RAS# to CAS# delay   (Trcd) Auto
  Min RAS# active time(Tras)  Auto                Places an artificial
  Row precharge time   (Trp)  Auto                memory clock limit on
  Row cycle time       (Trc)  07 Bus Clocks       the system.  Memory is
  Row refresh cyc time(Trfc)  Auto                prevented from
  Row to Row delay     (Trrd) 02 Bus Clocks       running faster than
  Write recovery time  (Twr)  02 Bus Clocks       this frequency
  Write to Read delay  (Twtr) 02 Bus Clocks
  Read to Write delay  (Trwt) 03 Bus Clocks
  Refresh period       (Tref) 3120 Cycles
  Odd Divisor Correct         Disable
  DRAM Bank Interleave        Enabled

  DQS Skew Control            Auto
  DQS Skew Value                 0
  DRAM Drive Strength         Auto

 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

Figure 8 - DRAM Configuration

Some will suggest that PCI-E Bus speed can make a difference to frame rates and fill rates. In theory at least, that doesn't quite make sense. Changing the bus speed at which the card's PEG link communicates does not necessarily change the internal memory or GPU clock speed noticeably. It is possible to change the reliability of the card's interconnection relative to the rest of the system's front side bus, but beyond this it is only PCI-E GPU and memory clocks that count.

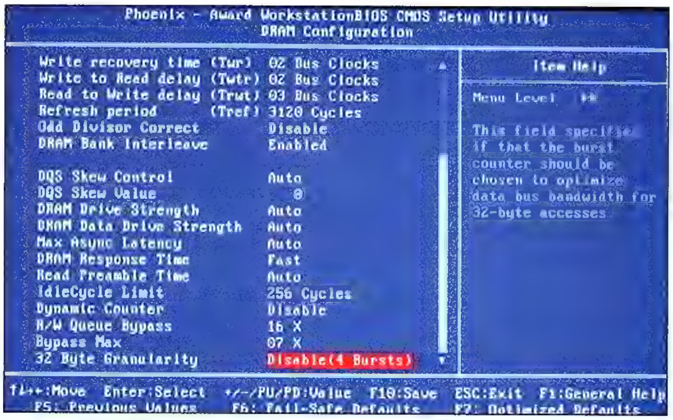
It is all in the timing

Though obvious to many of us, the common FSB and ratio settings for clock multipliers warrant a bit of extra explanation here. Different manufacturers use different nomenclature, but, generally speaking, one can work out the equivalence. We aren't about to give you the obvious stuff here. Voltage control to the CPU core is old hat, as is chipset/memory BUS voltage. There are more interesting things afoot!

DRAM timing functions

There are several parts to RAM timings that contribute to overall memory and I/O performance through the memory controller. In RAM performance nomenclature, we have a specific way of representing timing capabilities. The order of importance of timings is generally descending from left to right. Refer to Figure 9.

The transient information on any RAM module is addressed in rows and columns. Banks of modules are accessed from the memory controller via signals sent to the columns in the form of a Column Address Strobe (CAS). Before any data can be moved back and forth, the controller needs to wait for the Row Address Strobe (RAS) to CAS time (in our case, 2T). Once the RAS to CAS time period has lapsed, data flow can begin. Once the data has offloaded through the memory controller, the RAS Precharge time is effective. The RAS Precharge is the amount of time it takes to deactivate a row in memory and then wait for the next request. When putting timings into your BIOS, attacking your CAS timing first and cutting it down as far as possible is the most aggressive means of achieving fast transactions against rows and column look-ups. The extra functionality found on many performance motherboards such as TRRD are not new timing features per se, but derivatives or functions of the base four RAM control techniques (TRAS, TRP, TRCD, CAS).



```
            Phoenix - Award WorkstationBIOS CMOS Setup Utility
                           DRAM Configuration

  Write recovery time (Twr)  02 Bus Clocks          Item Help
  Write to Read delay (Twtr) 02 Bus Clocks
  Read to Write delay (Trwt) 03 Bus Clocks       Menu Level   ▶▶
  Refresh period      (Tref) 3120 Cycles
  Odd Divisor Correct        Disable             This field specifies
  DRAM Bank Interleave       Enabled             if that the burst
                                                 counter should be
  DQS Skew Control           Auto                chosen to optimize
  DQS Skew Value                0                data bus bandwidth for
  DRAM Drive Strength        Auto                32-byte accesses
  DRAM Data Drive Strength   Auto
  Max Async Latency          Auto
  DRAM Response Time         Fast
  Read Preamble Time         Auto
  IdleCycle Limit            256 Cycles
  Dynamic Counter            Disable
  R/W Queue Bypass           16 X
  Bypass Max                 07 X
  32 Byte Granularity        Disable(4 Bursts)

 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

Figure 9 - Memory timing nomenclature as found on most manufacturer's specifications

Stabilisation at the high end

At the very extreme end of OC'ing and tweaking, things can become a little odd. Think of it like the effects of approaching the speed of light. Stuff gets strange. At times, certain seemingly useless settings become critical when pushing for that extra performance when already @ 100% and beyond OC'ed.

Interleaving

DRAM Bank Interleaving is a quiet achiever. Interleaving allows banks of modules to alternate their refresh access cycles. If you push 512MB of data to the memory controller and it fills one bank, concurrently, during precharge time, another bank is already undergoing a refresh cycle to take the load of the next memory request, rather than waiting for your bank of 512MB to offload. Try enabling it and do some testing. We recommend non-synthetic benchmarking here.

DQS Skew

Swings and variances in voltage cause instability at high clock frequencies. The lower the variance in voltage, the less skew, and thus, the higher clock rate attainable. At a certain point, ramping of voltage shows a significant jump in skew. This can be reduced using the drive strength option but has the disadvantage of overshooting/undershooting voltage peaks/troughs. Using DQS Skew control will have a small but appreciable impact on memory bandwidth and global system stability at extremely high voltage throughput.

Forcing the command-per-clock

Command per clock (CTC) is probably the most aggressive 'extra' setting one can enable on a memory controller. This allows you to choose the delay time between the chip select signal and the time the memory controller starts sending commands to a row or bank. The lower the value, the quicker the memory controller can push commands out to live or active memory banks. Insane performance gains can result, but stability is very much on the edge of sanity here at 1T CTC ratings.

EFI: BIOS for the cool kids

It won't be all that long until BIOS disappears. It has been around for around 22 years. Limitations hurrying the death of BIOS are:

* Real mode IA-32 emulation
* A plain sight emulation of the ancient Intel 8086/8088
* Inefficient at providing information to client programs
* A usually hardcoded knowledge of supported boot devices. Support for adding new forms of bootable devices is typically added slowly, if not at all
* Legacy BIOS dependence on VGA
* Difficulty in deploying and managing computers in a zero-touch fashion even with standard network boot protocols such as PXE, and extreme difficulty when it comes to remote management at a system firmware level

EFI is all that BIOS should have been. We'll explore it more as the market grows. It's been a big trip through the 0's and 1's this month. Hopefully, armed with some of the more arcane aspects of low level BIOS manipulation, we Atomicans can better tweak, push and melt our hardware to full potential.

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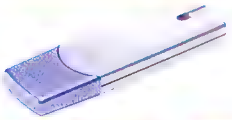

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I/O OF THE MONTH

Next month: Microwave-repair Russian Roulette

I I needed to replace the fuse in my Logitech Z-680 speaker system, so I bought the correct one, came home, turned the master switch off on the back of the subwoofer, turned the power off at the wall that leads to the power board, and grabbed my Philips screwdriver.

I placed the fuse on the end of the tunnel, then nudged it the rest of the way into the fuse cavity, not touching anything, but accidentally rested my left arm on the heatsink. And I got one hell of a boot!

Now I'm not game to touch it at all.

Why did I get booted and how can I prevent it? It baffles me. A friend told me that I need to unplug the powerboard from the wall. But I switched everything off - isn't that enough?

Tirmanaydor

O The only way this could have happened without some kind of electrical fault is if undischarged capacitors in the speaker's power supply were connected to the inner terminal of the fuse socket.

This doesn't seem very likely to me - the fuse socket ought to just be in-line with one side of the power transformer - but who knows. If this were the case, when you leant on the heatsink, your body provided a path to the amplifier chassis for the capacitor charge, and zap.

If this is what happened, then it would have happened whether the speaker was still connected to the turned-off wall socket or not. Devices with big caps in their power supply all ought to have something - usually a high-value resistor - that drains the capacitor charge over a relatively short time when the device is turned off, but not all of them actually do.

The other ways your shocking experience could have happened all involve one or another kind of electrical fault.

By far the favourite in this particular race is a wall socket whose switch interrupts the neutral conductor, not the active one. In that case, turning the wall switch off will leave the active conductor all the way into those devices live. There's no path *back* to your house wiring for the electricity to follow, so things plugged into that socket will turn off when you turn its switch off. But anything directly connected to the active line, including one side of the fuse holder in your speakers, will be live and awaiting developments.

The earth conductor isn't affected by switches. If a power cord has an earth pin (and if the earth contact in the wall socket is actually connected to earth...), then its earth conductor will always be connected to ground while it's plugged in. The earth conductor is connected to the chassis of all grounded appliances, so touching the chassis and something that's live will allow current to flow through you.

Incidentally, this is *exactly* the kind of situation in which a 'safety switch', or 'residual-current device' should trip.

Why *shouldn't* you mix electrical repair and bathing?

I/O OTM wins a Logitech G5!

There's a mouse in the house. Okay, it's not in the house, it's in IO. And it looks damn good.

I still think Video Floppy may make a comeback

I We have been discussing CompactFlash cards versus Secure Digital cards at work as to which is the best and why.

It looks like all the old digital cameras used CompactFlash and the newer ones SD cards, but then most digital SLR cameras seem to use CompactFlash.

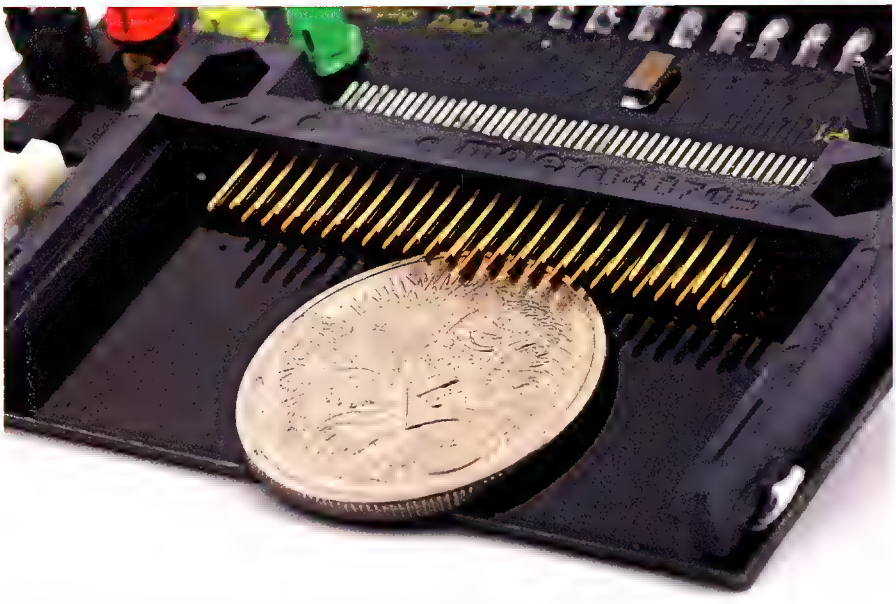
Is it because the CompactFlash cards use parallel data transfer and SD cards use serial and therefore the CF are faster? But this contradicts the PATA versus SATA HDD transfer speeds.

Peter Harvey

O This isn't a serial/parallel thing. SD does actually support a one-bit-at-a-time serial transfer mode, but that isn't really relevant here. A CompactFlash card is, essentially, a little ATA ('IDE') drive. You can use a cheap pin adaptor to plug a CF card into a PC PATA cable and the card will appear as another hard drive.

The advantages of the CF approach are that it can give very fast transfer rates (CF cards can, in theory, use all of the standard ATA DMA modes), and the standard is open and free. Anybody can make a CompactFlash card or a device that accepts them, without paying license fees for the technology (though using the CF *logo* still costs money!).

On the downside, the CF card socket has lots of little pins which, if they get bent, are extremely difficult to straighten. CF cards are also relatively large, and difficult to incorporate into small devices like pocket cameras. And high transfer rates don't matter most of the time - only if you're shooting rapidly in RAW mode are you likely to need more speed than the slower card formats



When you see a CompactFlash socket, it's kind of surprising that the things *ever* work.

offer.

SD and MMC cards (Secure Digital is MultiMediaCard plus Digital Rights Management options that almost nobody ever uses) are more than fast enough for almost all photography, far smaller than CF, and have a simple connector that's hard to mangle. The SD standard isn't free to use, but it's also obviously not expensive enough to discourage many companies.

The bigness of CF cards means they can have more than one actual Flash chip inside, giving a higher ceiling capacity; CompactFlash has always had the largest-capacity cards.

Again, though, only professional photographers are likely to care about the very expensive maximum-capacity cards at any given moment, and flash technology can now fit multiple gigabytes on a single very tiny chip. So there's not much advantage there now, either.

It might not be safe for Terminators, though

I have a laptop. I need to take it into an alumina refinery. Inside the refinery are 'pots', where alumina powder and large electric currents meet to produce aluminium.

Feeding the pots are bus bars. The bus bars have about 200,000 amps going through them. This creates strong magnetic fields.

How close can I get before my computer stops working? Or, how strong a magnetic field (gauss) can a laptop handle?

Sasha Lamont

The strength of the magnetic field around the bus bars - or any other conductor - is directly related to the current passing through them. The equation is

B=(1.257 * 10^-6 * I)/(2piR) ... where B is the field strength in tesla (one tesla is 10,000 gauss), I is the current in amps, and R is how far you are from the centre of the conductor.

For 200,000 amps and a distance of only one metre, this still gives only 0.04 tesla, or 400 gauss. That'd try pretty hard to grab a spanner out of your hands, but it's barely enough to wipe a floppy disk, if that.

You need a few thousand gauss at least to wipe a hard drive. You'd get that if you were only 10cm or so from the centre of the bus bars, but the bars and their surrounds are probably too thick for that to be possible.

Neither fish nor fowl

As I have some money burning a hole in my pocket and a computer that could do with an upgrade, I decided to look around to see what my Core 2 Quad options were.

I soon discovered that I needed a new motherboard. The ASUS P4P800 I have for my P4 2.8GHz CPU is a Socket 478 board, and for modern Intel CPUs I need a socket 775.

However, I have some apparently rather difficult-to-satisfy demands for the motherboard. As I bought a new AGP graphics card not long ago (a Radeon X1950 Pro), I would like a motherboard with both an AGP slot (for my current card) and a PCIe slot (for future upgrades). In addition, I need connections for at least four PATA devices and one SATA device (4 HDDs and a DVD-rewriter).

After some searching, I could only find a single motherboard that would satisfy these requirements: the Asrock 4CoreDual-SATA2. This mobo, however, is suspiciously cheap compared to the popular P35 boards overclockers are using with Core 2 Quads.

Am I missing something that makes that makes this board much less desirable, other than the lower number of PCIe slots?

Also, would I still be able to use my current two 512MB sticks of DDR-400 memory with a modern board, or would I have to buy new memory?

Roy

I think the best option, really, is to get a whole new computer. That way you still have your old one as a working PC.

If a second computer's of no value to you, though, then a VIA PT880 chipset board like the 4CoreDual-SATA2 may fit the bill well enough.

The 4CoreDual will let you use your old AGP card, with an upgrade path to a PCIe card later on. Some PT880 boards only have an x4 PCIe graphics card slot rather than the standard x16, though; the manual for the 4CoreDual is unclear about this. If so, then PCIe graphics cards won't run quite as fast as you'd expect, and some cards probably won't work.

The 4CoreDual will let you use your old RAM, though it only has two DDR slots plus another two DDR2 slots, and you can only use one kind of RAM at a time. So memory upgrading won't be an economical procedure - and you can only have a maximum of 2GB of memory, anyway.

I don't know about overclocking, either. Don't expect the 4CoreDual to have sterling support for running CPUs above stock speed.

As a budget option, it's not a bad one; I've seen much worse 'crossover' motherboards over the years.

Personally, though, I'd save up until I could afford a whole new P35-based system, and keep the old computer for backups or multiplayer games (or just sell it, of course).

Your need for at least two parallel ATA sockets in your new computer isn't a serious obstacle, either. Many new motherboards only have the one PATA socket, but you can get a PCI PATA controller card for not much on eBay, and run your other drives from that.

The *real* problem is typing with gauntlets on.

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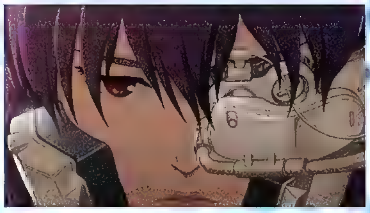

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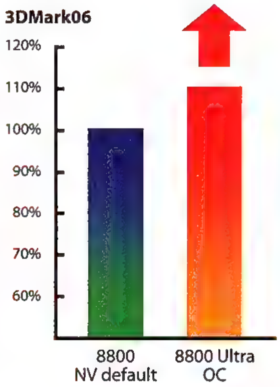

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Welcome to Atomic's new monthly education section. We'll help you choose your future, or change your present. You may want to completely reinvent yourself – we'll show you how. You may just want to learn more about something you love.

Bachelor of Computer Science

The Bachelor of Computer Science has a certain old-school charm to it. It's popular, too, available at most of Australia's major universities. **Christopher Taylor** enrols.

What is it?

So, what exactly is it? Monash University's website says that it '[focuses] on the software, hardware and underlying theory of computing and its applications to scientific and technical problem solving and to information processing in commerce and industry.'

It's a verbose but accurate description, although some of the former students we spoke to would debate the 'hardware' part. Sign up for a Computer Science course and you'll find yourself doing subjects--both core and elective--that cover a wide variety of topics, ranging from the nitty-gritty of hardware to heavy coding.

You can choose to concentrate your studies on any number of specialist fields and disciplines. Artificial intelligence, security, operating systems, database management, network management, games programming, Java and C++ development, object-oriented design and web applications programming are but some of the major areas of study Computer Science students may choose to focus on. Which of these are available to you depends on which university you attend, though, so if you're particularly passionate about a certain topic -- like, say, the games programming -- ensure that you go somewhere that offers it.

UQ Multimedia Design student, Natasha Spillane, demonstrates her interactive design project that replicates the experiences of a nightclub DJ.

Where can I study it?

Most of the major universities offer Computer Science. In Victoria, look to Monash University (**www.infotech.monash.edu.au/courses/2007/undergraduate/2380/index.html**), Deakin University (**www.deakin.edu.au/future-students/courses/course.php?course=S327&stutype=local&keywords=Computer%20Science#OVERVIEW**), La Trobe University (**http://www.latrobe.edu.au/cs/**), RMIT University (**www.rmit.edu.au/csit**), Victoria University (**csm.vu.edu.au/courses/undergraduate/sbco**) and the University of Melbourne (**www.csse.unimelb.edu.au**).

ACT residents are limited to Australian National University (**cs.anu.edu.au**), while New South Welshmen can choose from the University of New South Wales (**www.cse.unsw.edu.au**), the University of Wollongong (**www.uow.edu.au/informatics/scsse/index.html**), the University of Newcastle (**www.newcastle.edu.au/program/10177.html**), the University of New England (**www.une.edu.au:80/courses/2008/courses/BCOMP**), the University of Macquarie (**www.handbook.mq.edu.au/programofstudy.php?edition=2007&code=COMP01**) and Charles Sturt University (**www.csu.edu.au/courses/undergraduate/computer_science**).

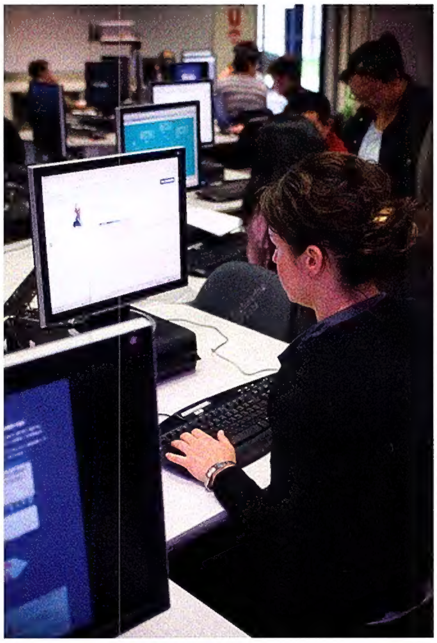
Queenslanders can look to the University of Queensland (**www.uq.edu.au/study/plan.html?acad_plan=COMPUX2030&acad_prog=2030**), the University of Southern

Queensland (**www.usq.edu.au/handbook/current/sci/BINT.html**) and James Cook University (**www.jcu.edu.au/fse**).

South Australians has the University of Adelaide (**www.adelaide.edu.au/programfinder/2008/bcomp_bcmpsci.html**), the University of South Australia (**www.cis.unisa.edu.au**) and Flinders University (**www.flinders.edu.au/calendar/vol2/ug/BSc.comp_major.htm**) all offer Computer Science.

Western Australia has the University of Western Australia (**admissions.uwa.edu.au/undergrad/courses/computer_science_and_information_technology**), Curtin University of Technology (**handbook.curtin.edu.au/courses/15/151099.html**), Edith Cowan University (**www.scis.ecu.edu.au**) and Murdoch University (**handbook.murdoch.edu.au/courses/detail07.lasso?crscdhb=COMPSC**).

All is not lost if you're from Tasmania or the Northern Territory-- remember that there's nothing stopping you from moving interstate to study!



▲ **Hacking away at a bright future.**

How do you get into Computer Science?

A hard question to answer. Requirements -- and we're talking in terms of those of you in your final years of secondary schooling here -- vary from state to state, institute to institute, campus to campus. In general, though, you're going to want to finish Year 12 with decent marks.

By way of prerequisite subjects, most of the institutes we've listed want you to have studied whatever your state's mid-level mathematics offering is (i.e. in Victoria this would be Maths Methods, in New South Wales this would be Extension). In some cases, they may want you to have done a high-level mathematics subject. Even if they don't *require* it, tackling heavy maths will work in your favour.

What do the students think?

The best measure of the worth the Bachelor of Computer Science is, of course, the opinions of current and former students. Quite a few people on the Atomic forums happen to fall into this category, so over the past month we asked around and came up with some interesting feedback.

Something you should be aware of, according to forum user Sneddo, is that you'll have to do a number of 'non-technical subjects aimed at improving the communication skills of your average Computer Science geek.' Myra`Jai mentioned this too. She felt such things were 'a waste of time,' although her comment was directed more at the culture and history subjects that her university required her to do.

Myra`Jai also notes that when selecting a course, you should ensure that it has an accreditation from the Australian Computer Society. 'This allows the student to join a professional body without jumping through hoops after they graduate, she says. 'Also, don't be afraid to change your mind about what you are studying. I enjoyed writing code and making the machine do clever things, but I discovered I much preferred designing and engineering the software to meet the requirements. This means working at a more abstracted level than a code hacker. Be aware that working in this field means being able to write reports, manuals and user documentation as well. There are some people skills involved.'

As for the value of the course, opinions vary. Most of the students, both past and present, commented that the Bachelor is heavy in theory, but low on real world experience. 'Our sample group really enjoyed learning new things, but some felt as if the worth of what was taught was minimal.' Sneddo had the most extreme reaction. 'In my opinion it's the arts degree of IT -- while it has some really interesting subjects and you can somewhat choose a direction, at the end of it all it's largely pointless.'

Others were more positive. khendar said that the shortage of practical work was fine, as the background knowledge that the Bachelor focuses on giving you is enough to 'allow you to easily step into' a real world situation.

Where will it get me?

Perhaps coincidentally, those we surveyed are either still studying or working in unrelated fields. justo316, who was disappointed by the Bachelor's shortage of hardware-focused subjects, is now working as an IT tech. He says this has 'nothing to do with me getting a Computer Science degree.'

Universities promise the world when it comes to discussing what sort of jobs a degree will get you. Certainly, if you choose your units correctly, plan ahead, chat with the university's support officer and pay attention to sites like **seek.com.au** to see what employers actually want you can find yourself qualified for all sorts of exciting jobs, from games programming to web security work.

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FALLOUT

Funnies and humour from the fallout zone

I shoot things!

Logan Booker surrounds himself in a halo of stupidity.

Murderous alien invaders and saving the world he could deal with, but when it came to map reading, the Master Chief had a serious problem.

It was one of those silly things he'd never bothered to mention to his superiors during training. Hell, the Chief reasoned, why do I need to read maps when they just drop me on top of what I need to blow up? And surely knowing how to fire a tripod machinegun from the hip while smoking a cigar is more important than being able to find the closest Wendy's?

His squad, however, begged to differ. They'd already lost Sampson after the Chief had inadvertently marched him into the middle of an allied minefield, and Davidson had been sent ahead to scout hours ago. As far as the Chief knew, with the directions he'd given him, he had just as much chance of finding Atlantis as he did the forward Covenant base.

As the Chief continued to stare in feigned understanding at the map, McDonough, his second-in-command, approached.

'Sir? It's been ten minutes. Do you know where we are?'

The Chief confidently raised his head. 'Yes, yes of course.'

'No more minefields I take it then?' The Chief's helmet hid his grimace. It was quickly replaced determined scowl; he was going to make this right. He pulled the map between them and pointed at a location towards the centre of the document. 'You see that depression there? The one surrounded by trees, with the rock outcropping that provides an almost perfectly defensible position?'

'Yes, sir.'

'I'm quietly confident that we're nowhere near it.'

McDonough sighed. Before the 2IC could take a proper look at the map, the Chief pulled it away. 'What does your compass say, sir?'

The Chief stared at him in confusion. Not that McDonough could see that. 'Compass? When did they give us those?'

'It's standard issue, sir. Just check that pocket on your suit.' He pointed at the Master Chief's hip.

'What, that one?'

'Yes sir.'

'Ah.'

McDonough sighed again. 'What is it, sir?'

'What would you say, if I was tell you I took my compass out and, uh, replaced it with a spare clip.'

'Well, if you were anyone else, I'd say you were an idiot.'

'Oh, well that's good then.'

They stared at each other for a few moments, as their competing intelligences fought to understand one another from two wildly different levels. While the Master Chief contemplated how he might acquire a new compass from McDonough, the 2IC tried desperately to understand how the Chief found the brain power to inflate and deflate his lungs at regular intervals.

'I don't suppose you have a spare?'

'No sir. No I don't.' McDonough took a deep breath. 'Look, why don't I take a look?'

The Master Chief shrugged and handed him the map. McDonough survey the plastic-coated parchment for a few seconds, before shaking his head.

'Sir?'

'Yes?'

'You do, uh, you do realise that this isn't a map. It's Risk.'

'What?'

'It's the play board for Risk. You sent Davidson to invade East Germany.'

'Well, he's going to have some trouble doing that all by himself, I imagine.'

McDonough sighed. They'd be lucky to make to back to base alive.

NEXT MONTH

VISTARAMA

Two mega features essential for all Vista runners. We've got a huge Vista gaming feature, now that the thing is *finally* starting to show its gaming worth, and a Vista tweaking guide, so you can squeeze the most juice out of it all.

BUILDING BIG WILLY

The wraps are off Atomic's new wonder box. If it was filled with dynamite, it'd explode.

SOUND TECH

Reckon your onboard sound is good enough? Get real! The latest sound cards are audiophile wonders, and we'll tell you why you need one.

CHRISTMAS GIFT GUIDE

Atomic style. All the stuff you really should be buying for your loved ones, but will probably end up buying for yourself.

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